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HS-803 276

PERFORMANCE CHARACTERISTICS OF AUTOMOTIVE ENGINES IN THE UNITED STATES

Second Series--Report No. 2

1976 Chevrolet 305 CID (5.0 Liters), 2V

T.W. Chamberlain
D.E. Koehler
K.R. Stamper
W.F. Marshall

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INTERIM REPORT

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VIRGINIA 22161

Prepared for

U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Research and Development
Washington DC 20590

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16. Abstract

Experimental data were obtained in dynamometer tests of a 1976 Chevrolet 305-CID V-8 engine to determine fuel consumption and emissions (hydrocarbon, carbon monoxide, oxides of nitrogen) at steady-state engine-operating modes. The objective of the program is to obtain engine-performance data for estimating emissions and fuel economy for varied engine service and duty. The intent of the work is to provide basic engine characteristic data required as input for engineering calculations involving ground transportation.

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PREFACE

This report, prepared by the U.S. Department of Energy, Bartlesville Energy Research Center, for the U.S. Department of Transportation, Transportation Systems Center, Energy Technology Branch, Cambridge MA, presents results of experimental work to obtain information on performance characteristics of engines used in automobiles sold in the United States. The data presented in this report are from one of a series of 10 engines to be tested in the current program. This is the second of the reports to be published covering work with those engines.

The objective of this program is to obtain fuel consumption and emissions data at steady-state conditions throughout each engine's operating range. These tests provide the basic engine characteristic data required to predict engine/emission control-system performance for transient operation.

This project is funded by the National Highway Traffic Safety Administration, Office of Research and Development, Office of Passenger Vehicle Research, Technology Assessment Division.

Ralph G. Colello and James A. Kidd, Jr., of the U.S. Department of Transportation, Transportation Systems Center, are the technical monitors.

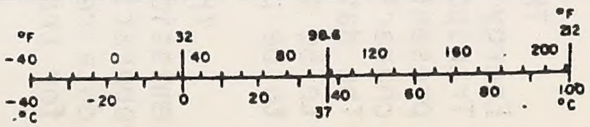
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



1. INTRODUCTION

Data acquired from steady-state tests of a 1976 Chevrolet 305 cubic-inch-displacement V-8 engine are presented in this report. The test results are sufficient to establish maps of fuel consumption and emissions of carbon monoxide, unburned hydrocarbons, and oxides of nitrogen over the operating range of the engine.

The Chevrolet 305-CID engine is one of a series of 10 production engines to be tested in the current program. The steady-state maps of emissions and fuel economy generated by this program may be used to predict engine and emission control system performance for transient operation.

2. ENGINE TEST REPORT

A new mean-tolerance 1976 Chevrolet 305-CID V-8 engine was acquired for this series of tests. The engine was mounted on a test stand and coupled to an eddy-current dynamometer. All engine accessories were included in the test-stand installation except for the cooling fan and radiator. An alternator was mounted on the engine but was not connected to the electrical system. The manufacturer's engine specifications are listed in table 1.

Prior to testing, the engine was broken in according to the schedule outlined in table 2. A single batch of unleaded, regular grade gasoline was used for the entire break-in and testing program. An analysis of the fuel appears in table 3.

Steady-state tests of the engine were made at the speed and load conditions indicated in table 4. The engine was driven by an electric motor at selected conditions to simulate closed throttle decelarations. The following data were recorded at each test point:

Test number
Date
Barometric pressure, mm Hg
Dew point, °F
Inlet air temperature, °F
Speed, rpm
Torque, lb-ft -- BLH strain gage load cell; Daytronics indicator
Fuel rate, lb/hr -- Fluidyne positive displacement fuel flowmeter
Ignition timing, °BTC
Manifold vacuum, in. Hg
Throttle Angle, deg
CO, pct -- Beckman NDIR
CO_2, pct -- Beckman NDIR
O_2, pct -- Beckman polarographic detector
HC, ppmC -- Custom-built heated flame ionization detector
NO_x, ppm -- Thermo-Electron chemiluminescent detector
Oil temperature, °F
Oil pressure, psig
Coolant temperature, °F
Exhaust temperature, °F
Exhaust pressure, in. H_2O
Intake manifold temperature, °F.

The following equations were used in calculating power, air/fuel ratio, absolute humidity, and mass emission rates of carbon monoxide (CO), unburned hydrocarbons (HC), and oxides of nitrogen (NO_x):

1. Partial pressure of water vapor in intake air (millimeters of mercury):

$$P = \exp\left[18.717 - \frac{7308.1}{393 + D}\right],$$

where D = dewpoint, °F.

2. Absolute humidity (grains moisture per pound dry air):

$$H = \frac{4347.8(P)}{B - P},$$

where B = barometric pressure, mm Hg.

3. Humidity correction factor (dimensionless):

$$K_H = \frac{1}{1 - 0.0047(H - 75)}.$$

Note: This factor is used to correct the NO_x mass emission rate to a standard humidity of 75 grains moisture per pound dry air.

4. Stoichiometric air/fuel ratio (dimensionless):

$$AF_s = \frac{69(2 + \frac{x}{2} - y)}{MW_{fuel}},$$

where x = hydrogen-carbon atomic ratio of fuel
y = oxygen-carbon atomic ratio of fuel
MW_{fuel} = fuel molecular weight per carbon atom
= 12.01115 + 1.00797x + 15.9994y.

5. Hydrogen concentration in raw exhaust (percent):

$$H_2 = \frac{x(CO)(CO + CO_2)}{2(CO + 3CO_2)},$$

where CO = carbon-monoxide concentration (percent)
CO_2 = carbon-dioxide concentration (percent).

Note: This equation assumes a water-gas shift equilibrium constant

$$\frac{(CO)(H_2O)}{(CO_2)(H_2)} = 3 .$$

6. Correction factor for emission concentrations from wet basis to dry basis (dimensionless):

$$C_W = 1 + \frac{(\frac{x}{2})(CO + CO_2) - H_2}{100} .$$

Note: In these tests, only HC is measured on a wet basis. All other species are measured on a dry basis.

7. Air/fuel ratio (dimensionless):

$$AF = \frac{AF_S}{2 + \frac{x}{2} - y} \left[\frac{(1 + \frac{x}{2} - y)(CO) + (2 + \frac{x}{2} - y)(CO_2) + 2(O_2) + \frac{NO_x}{10^4} - H_2}{CO + CO_2 + C_W (\frac{HC}{10^4})} \right] ,$$

where O_2 = oxygen concentration (percent)
NO_x = oxides of nitrogen (ppm)
HC = unburned hydrocarbon concentration (ppmC) .

8. Exhaust flow (pounds per hour):

$$M_{EX} = \frac{M_F(1 + AF)}{C_W} ,$$

where M_F = fuel flow rate (pounds per hour).

9. Carbon monoxide mass emission rate (grams per hour):

$$M_{CO} = M_{EX}(\frac{CO}{100})(\frac{MW_{CO}}{MW_{EX}})453.59237 ,$$

where MW_{CO} = molecular weight of CO (=28.01115)
MW_{EX} = molecular weight of exhaust gas (=28.967).

10. Unburned hydrocarbon mass emission rate (grams per hour):

$$M_{HC} = M_{EX}(\frac{HC}{10^6})(\frac{MW_{HC}}{MW_{EX}}) C_W \; 453.59237,$$

where MW_{HC} = molecular weight per carbon atom of HC
= 12.01115 + 1.00797x + 15.9994y.

11. Oxides of nitrogen mass emission rate (grams per hour):

$$M_{NO_x} = M_{EX}\left(\frac{NO_x}{10^6}\right)\left(\frac{MW_{NO_x}}{MW_{EX}}\right)(K_H)453.59237 ,$$

where MW_{NO_x} = molecular weight of NO_2 (=46.0028) .

12. Power (brake horsepower corrected to a standard barometric pressure of 736.6 mm Hg and a standard temperature of 85° F):

$$HP = \frac{N(T)}{5252.113}\left(\frac{736.6}{B - P}\right)\sqrt{\frac{t + 460}{545}} ,$$

where N = engine speed (revolutions per minute)
T = brake torque (foot-pounds)
t = air temperature (°F) .

3. DISCUSSION OF TEST RESULTS

The maximum torque and power outputs measured in these tests are in agreement with the manufacturer's specifications. Emission rates of CO, HC, and NO_x are typical of controlled late-model engines. In the low-power output modes, the engine's oxidation catalyst was efficient in controlling CO and HC. The engine's exhaust-gas-recirculation (EGR) system was effective in controlling NO_x emissions. As power output was increased, the air/fuel ration decreased, resulting in less effective catalytic treatment of CO and HC. Oxides of nitrogen emissions tended to peak at about 50 percent of maximum power. Beyond this power level, fuel-rich engine operation resulted in a decrease in NO_x emission rates. See figures 1 through 6.

4. CONCLUSIONS

The purpose of the experimental work here is to establish data for this engine. Those data are presented in the tables accompanying this report.

TABLE 1. MANUFACTURER'S ENGINE SPECIFICATIONS

Displacement, cu in	305
Maximum horsepower, bhp @ 3,800 rpm	140
Maximum torque, lb-ft @ 2,000 rpm	245
Bore and stroke, in	3.736 x 3.48
Configuration	V-8
Compression ratio	8.5:1
Firing order	1-8-4-3-6-5-7-2
Ignition timing at idle speed, °BTDC @ 600 rpm	8
Block material	cast iron
Head material	cast iron
Number of crankshaft main bearings	5
Number of compression rings/piston	2
Number of oil rings/piston	1
Cam drive type	sprocket and chain
Valve lift:	
Intake, in	0.372
Exhaust, in	0.410
Valve timing:	
Intake opens, °BTC	38
Intake closes, °ABC	82
Exhaust opens, °BBC	88
Exhaust closes, °ATC	52
Spark plug gap, in	0.045
Engine weight, lb	590
Exhaust-gas-recirculation system:	
Valve type	tapered stem
Control signal	ported vacuum
Point of discharge	intake manifold
Crankcase emission control:	
Control method	positive crankcase ventilation
Point of discharge	intake manifold
Carburetor type	2-barrel down draft
Distributor specifications:*	
Centrifugal advance, begins, ° @ 1,000 rpm	0
Centrifugal advance, intermediate, ° @ 1,700 rpm	10
Centrifugal advance, full, ° @ 3,800 rpm	20
Vacuum advance, begins, ° @ 4 in. Hg	0
Vacuum advance, maximum, ° @ 12 in. Hg	18
Carburetor number	17056108
EGR valve number	7044090
Distributor number	1112977

*Crankshaft rpm and deg.

TABLE 2. ENGINE BREAK-IN SCHEDULE

Simulated vehicle speed, mph	Engine speed, rpm	Manifold vacuum, in. Hg	Fraction of time in mode, hr
0	Idle	14.0	1/10
20	1,000	14.5	"
30	1,300	11.0	"
40	1,600	10.5	"
50	1,950	11.5	"
60	2,250	12.0	"
25	1,150	12.0	"
35	1,450	11.0	"
45	1,800	11.0	"
55	2,100	10.5	"

Mileage per cycle = 90.
Total mileage accumulated over 40-hour break-in period = 1,440.

TABLE 3. FUEL ANALYSIS

Fuel No	7619
Research octane No	91.5
Motor octane No	83.5
Specific gravity	0.7161
API gravity, deg	66.1
Distillation, °F:	
10 pct evaporated	128
50 pct "	218
95 pct "	404
100 pct "	417
Reid vapor pressure, psig	9.5
FIA analysis, pct:	
Aromatics	6
Olefins	17
Paraffins	77
Sulfur, pct	0.024
Lead, grams/gal	Trace
Hydrogen/carbon atomic ratio	2.040
Oxygen/carbon atomic ratio	0.000

TABLE 4. TEST-NUMBER CROSS-REFERENCE INDEX

Pct Full Load	Engine Speed, rpm											
	600	800	1,000	1,300	1,500	1,600	2,000	2,500	3,000	3,500	3,800	4,000
0		1 69	12 77	20 82		28 87	36 92	44 97	52 102	60 107	68 112	
10			11 76	19 81		27 86	35 91	43 96	51 101	59 106	67 111	
25			10 75	18 80		26 85	34 90	42 95	50 100	58 105	66 110	
40		2 70	9 74	17 79		25 84	33 89	41 94	49 99	57 104	65 109	
60			8 119	16		24	32	40	48	56	64	
75			7 73	15 78		23 83	31 88	39 93	47 98	55 103	63 108	
90			6	14		22	30	38	46 140	54	62	
100	4 72	3 71	5	13		21	29	37	45 114	53 115	61	113
Motored		128	129		130	131						

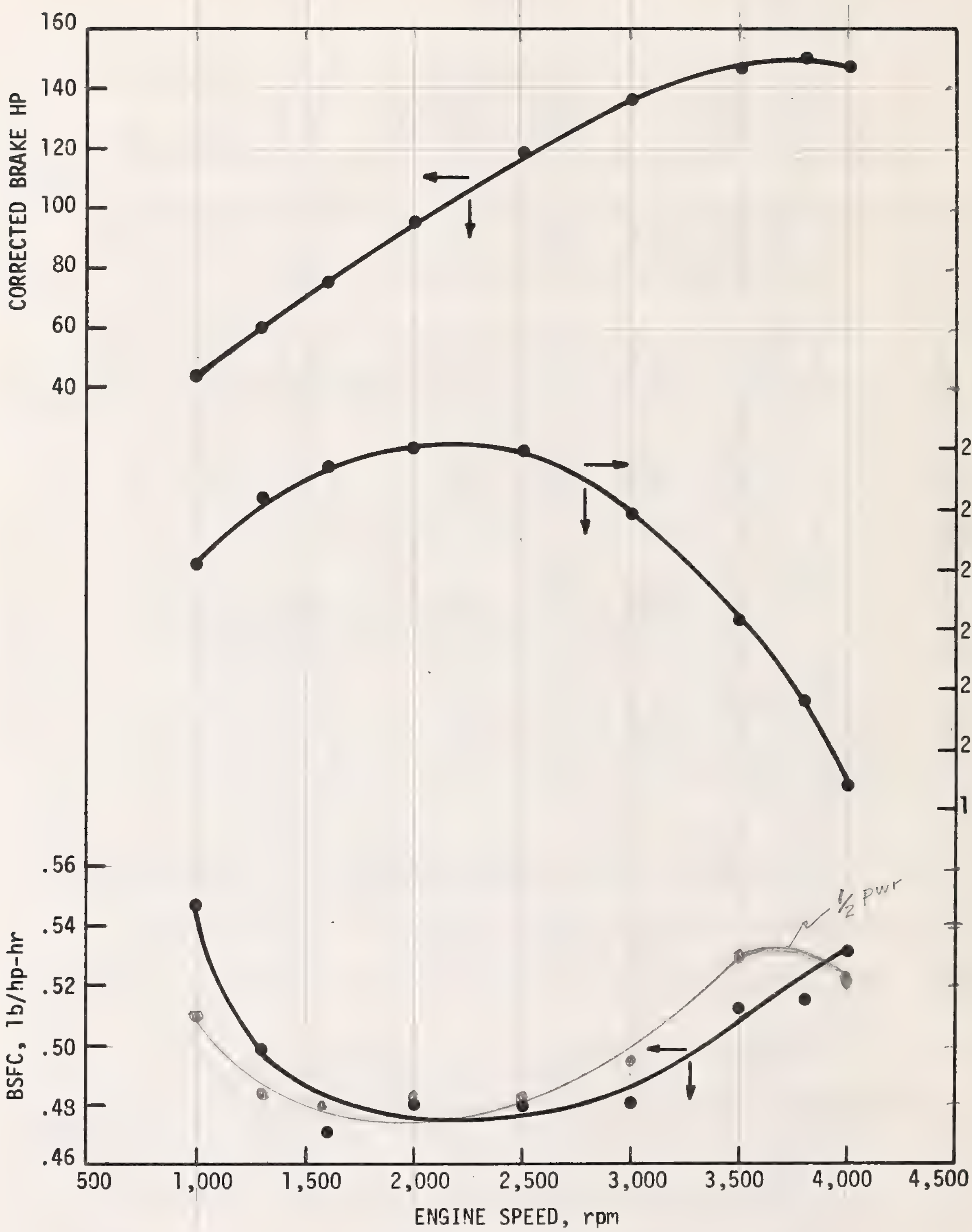


FIGURE 1. Brake Specific Fuel Consumption, Torque, and Brake Horsepower versus Engine rpm at Wide-Open-Throttle--Chevrolet 305-CID Engine.

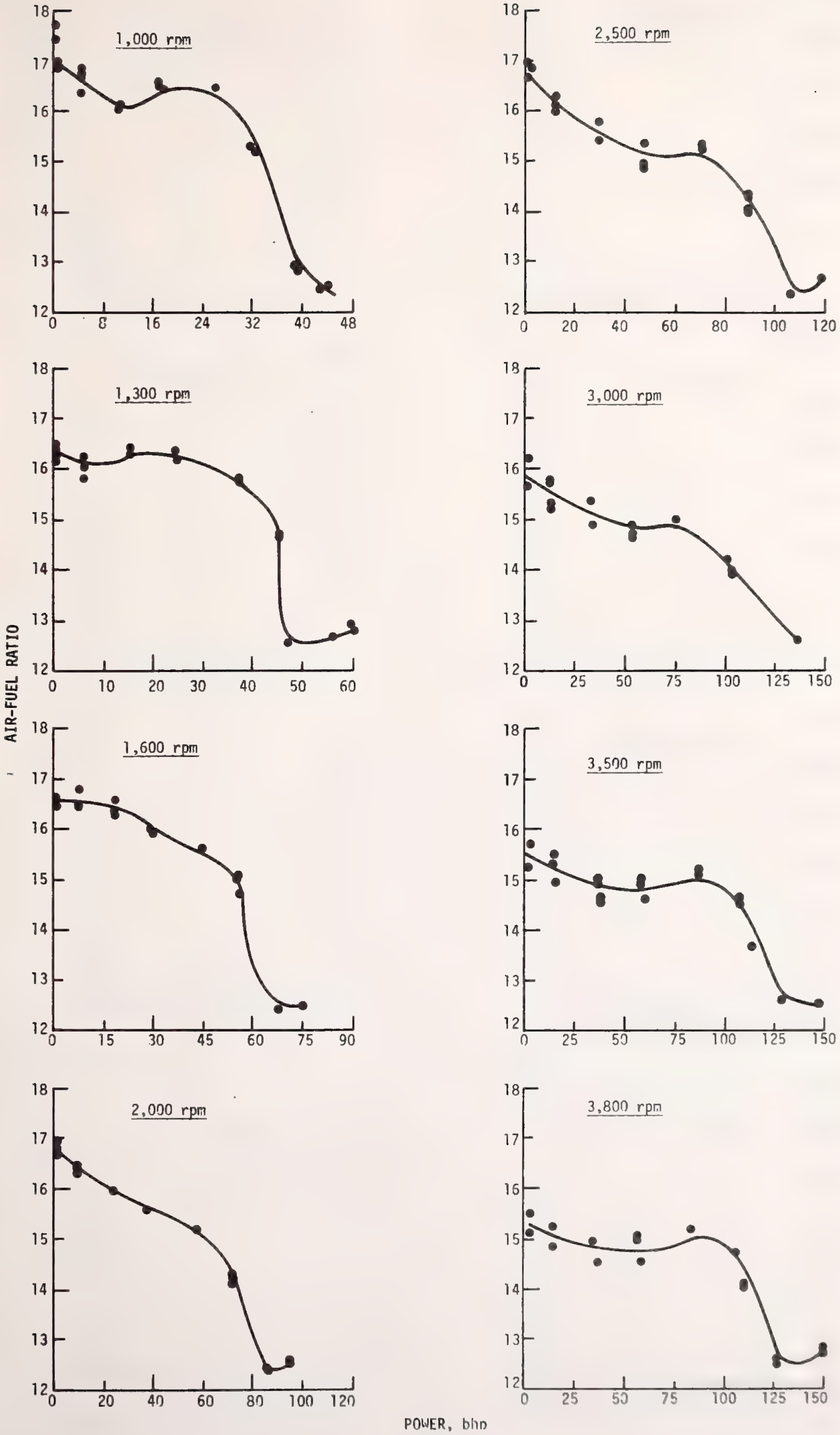


FIGURE 2. Air Fuel Ratio versus Power at Various Speed and Load Conditions--Chevrolet 305-CID Engine.

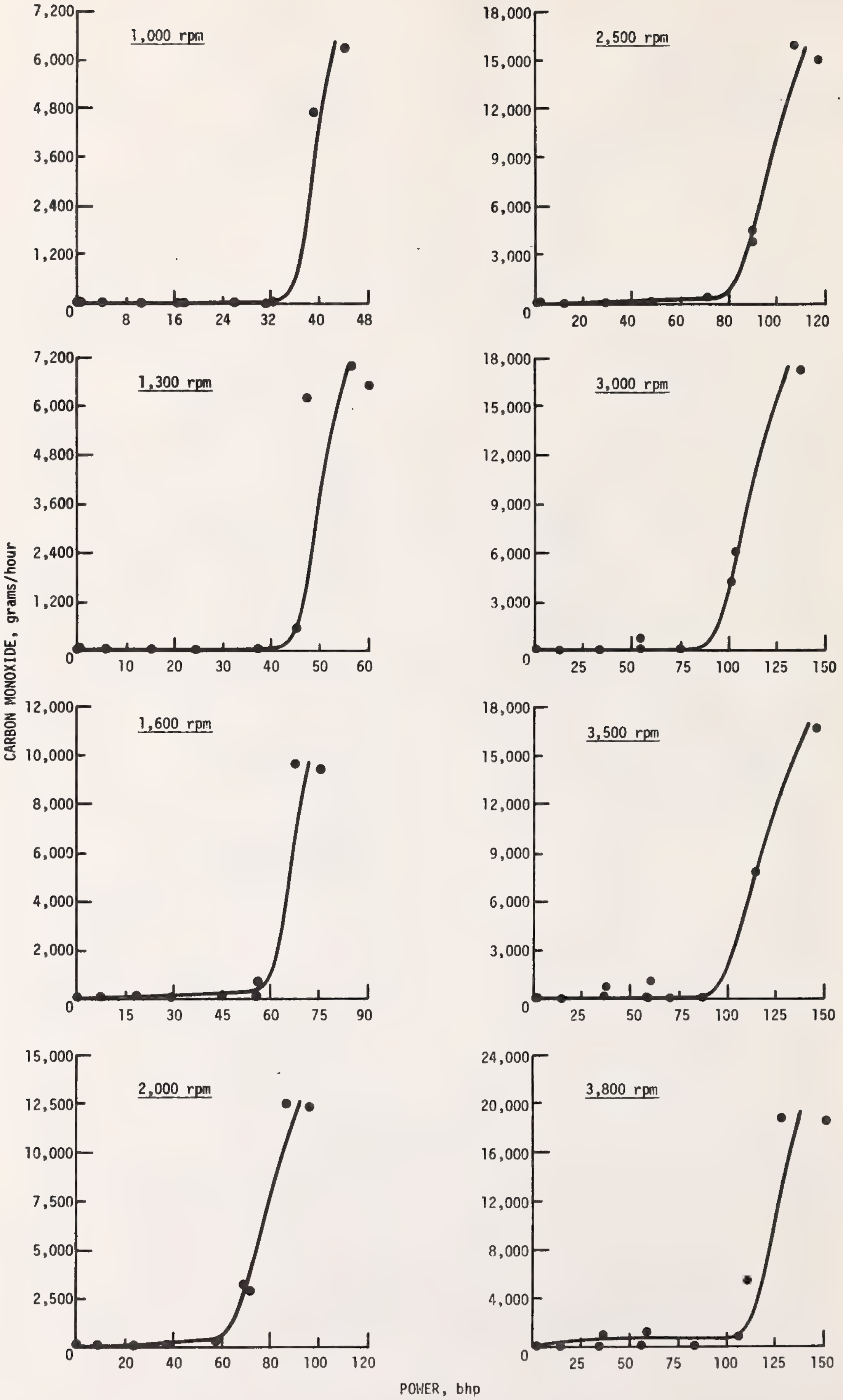


FIGURE 3. Carbon Monoxide Emissions versus Power at Various Speed and Load Conditions--Chevrolet 305-CID Engine.

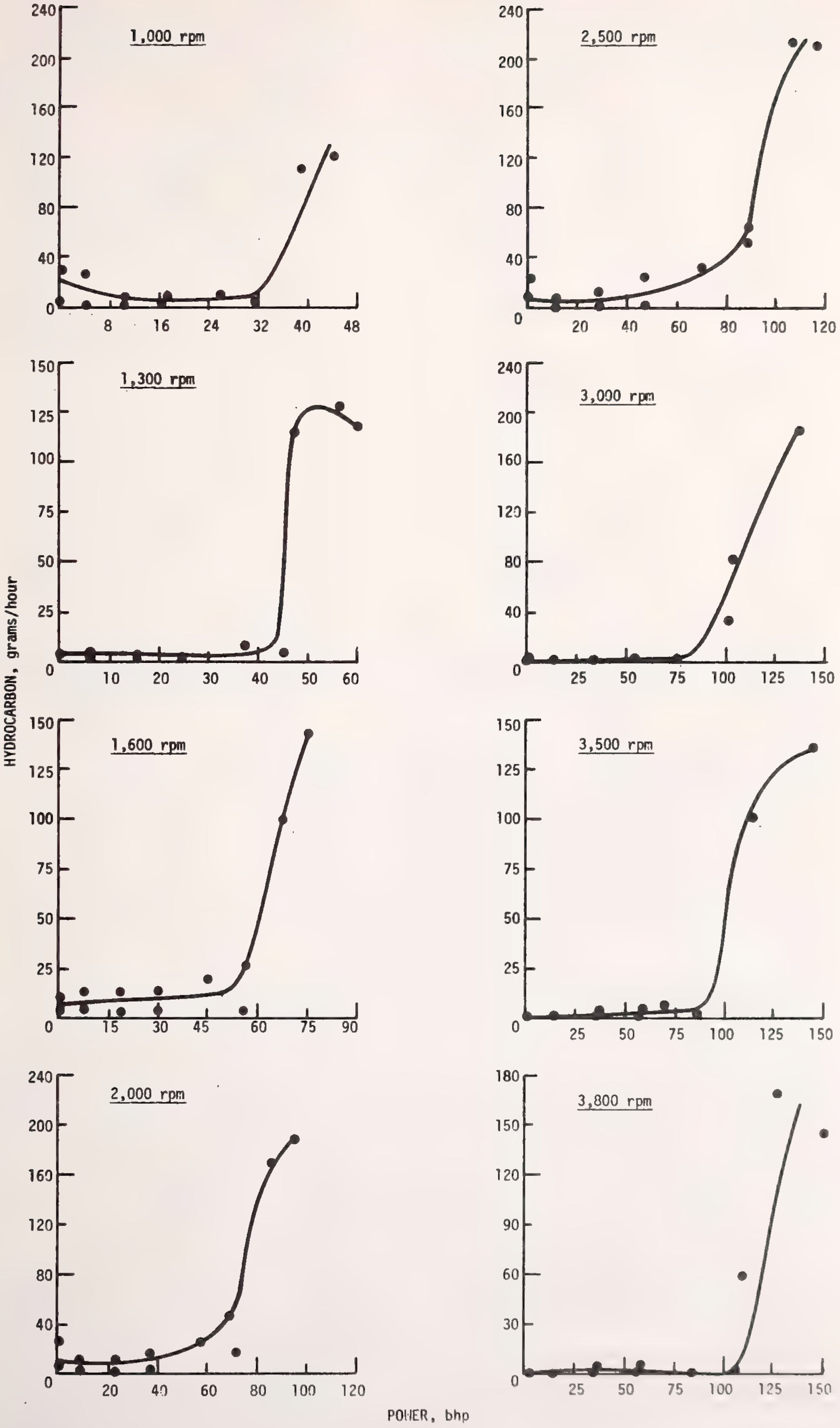


FIGURE 4. Hydrocarbon Emissions versus Power at Various Speed and Load Conditions--Chevrolet 305-CID Engine.

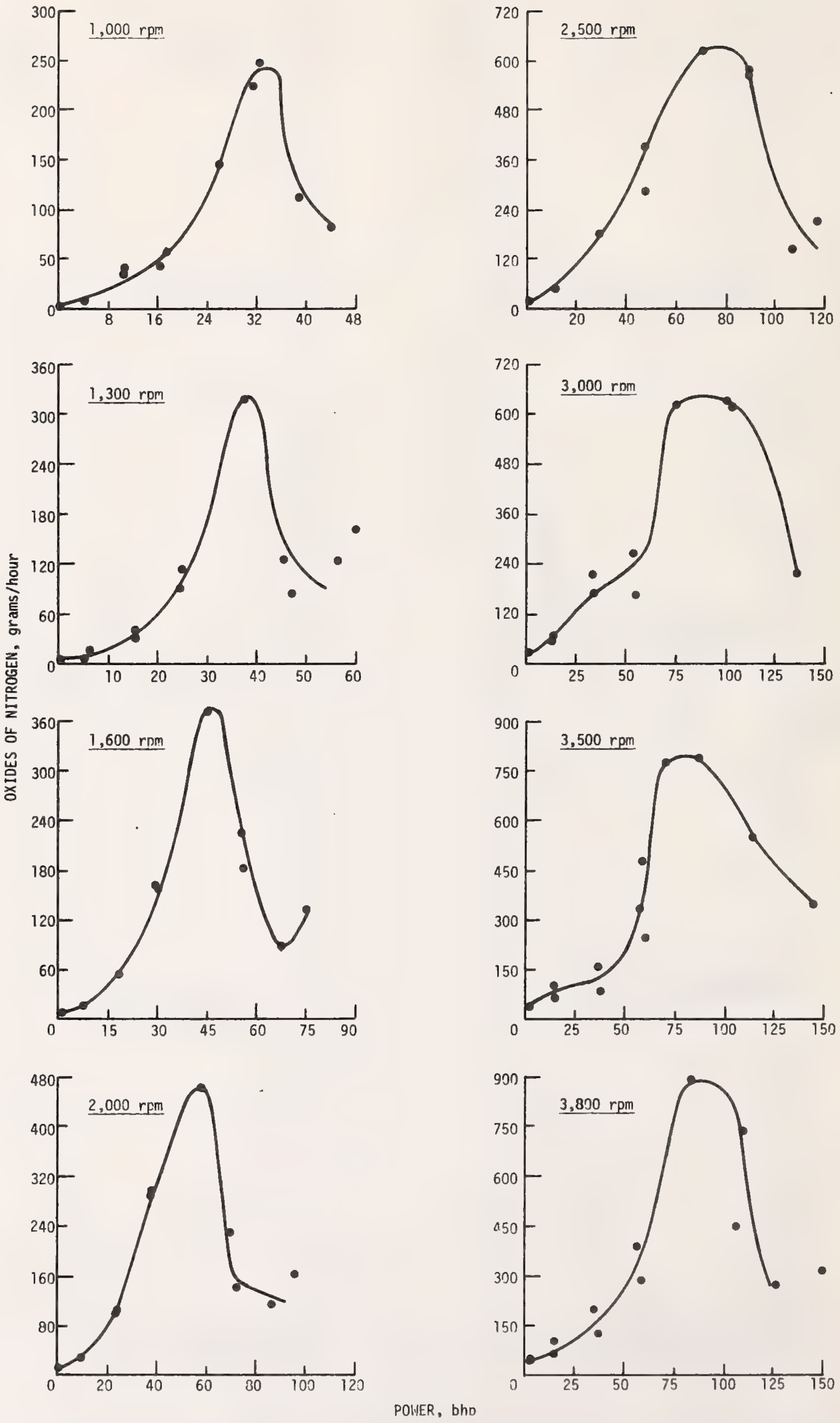


FIGURE 5. Oxides of Nitrogen Emissions versus Power at Various Speed and Load Conditions--Chevrolet 305-CID Engine.

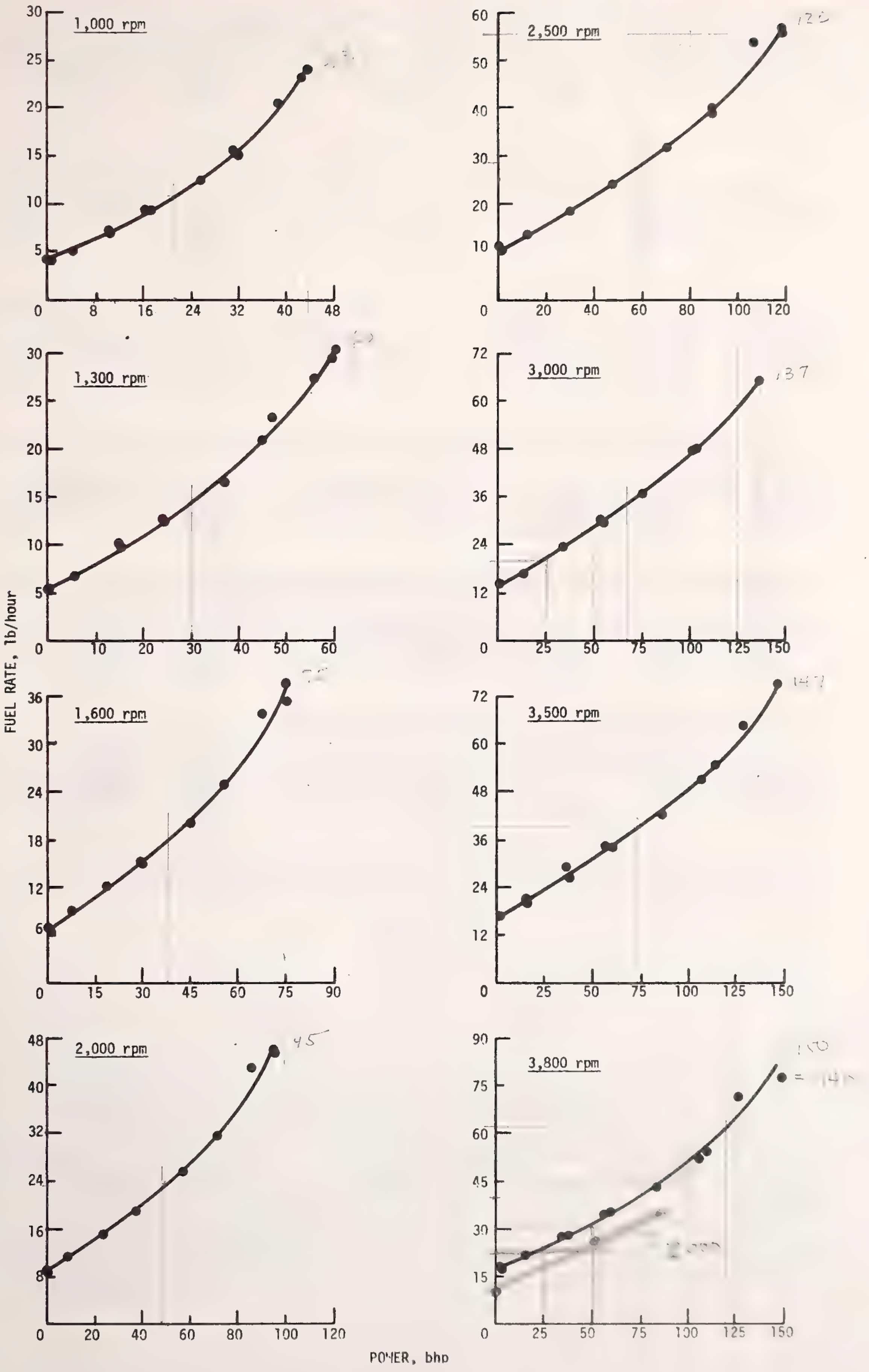


FIGURE 6. Fuel Rate versus Power at Various Speed and Load Conditions--Chevrolet 305-CID Engine.

ENGINE CODE CHE305

TEST NUMBER	1.1	1.2	2.1	2.2	3.1	3.2
TEST DATE	3/11/77	3/11/77	3/11/77	3/11/77	3/11/77	3/11/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	729.1	729.1	729.1	729.1	729.1	729.1
HUMIDITY, GRAINS/LB	54	54	54	54	54	54
TEMPERATURE, F	129	78	80	80	80	79
ENGINE SPEED, RPM	800	800	800	800	800	800
TORQUE, FT-LB	2.0	2.0	13.7	14.7	30.0	30.0
POWER, BHP*	.3	.3	2.1	2.3	4.7	4.7
FUEL RATE, LB/HR	3.5	3.5	4.0	4.0	4.7	4.7
IGNITION TIMING, DEG BTDC	25.0	25.0	25.0	25.0	25.0	25.0
MANIFOLD VACUUM, IN HG	18.7	18.5	18.2	18.3	17.3	17.2
THROTTLE ANGLE, DEG	.0	.0	.0	.0	.0	.0
INTAKE MAN. TEMP., F	112	124	113	113	111	110
CONCENTRATIONS, DRY BASIS						
CO, %	.7000	.0402	1.1049	.0553	.5706	.0597
CO2, %	9.00	12.15	11.30	12.51	12.25	13.06
O2, %	7.20	4.06	4.49	3.04	3.01	2.35
HC, PPMC	21381	2896	9568	2815	3491	601
NOX, PPM	34	80	94	128	205	220
AIR/FUEL RATIO	17.71	17.64	16.50	16.79	16.38	16.47
EMISSION RATES, G/HR						
CO	185.2	10.3	304.5	15.2	181.2	19.0
HC	284.1	37.3	132.4	38.9	55.7	9.6
NOX+	1.3	3.1	3.9	5.3	9.8	10.5
OIL TEMPERATURE, F	188	192	192	192	193	194
OIL PRESSURE, PSI	32	22	22	22	22	22
COOLANT TEMPERATURE, F	183	182	183	183	185	184
EXHAUST PRESSURE, IN. H2O	1.0	.0	1.0	.0	1.0	.0
EXHAUST TEMPERATURE, F	464	886	568	722	595	664

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	4.1	4.2	5.1	5.2	6.1	6.2
TEST DATE	3/11/77	3/11/77	3/15/77	3/15/77	3/11/77	3/11/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	729.1	729.1	750.0	745.3	729.1	729.1
HUMIDITY, GRAINS/LB	54	54	51	51	54	54
TEMPERATURE, F	79	79	81	81	83	83
ENGINE SPEED, RPM	600	600	1000	1000	1000	1000
TORQUE, FT-LB	29.1	29.1	226.6	231.0	200.8	199.7
POWER, BHP*	3.4	3.4	42.7	43.9	39.1	38.8
FUEL RATE, LB/HR	3.6	3.5	23.4	24.0	20.7	20.5
IGNITION TIMING, DEG BTDC	25.0	25.0	8.0	8.0	8.0	8.0
MANIFOLD VACUUM, IN HG	16.0	15.9	.3	.3	2.9	2.8
THROTTLE ANGLE, DEG	.0	.0	71.0	71.0	20.0	20.0
INTAKE MAN. TEMP., F	112	111	94	89	102	102
CONCENTRATIONS, DRY BASIS						
CO, %	.2326	.0289	5.3400	5.0900	4.4050	4.3181
CO2, %	11.48	12.38	11.29	11.31	11.39	12.01
O2, %	4.27	3.36	.13	.07	.19	.13
HC, PPMC	8111	4050	2293	1947	2224	2029
NOX, PPM	168	178	625	450	1054	692
AIR/FUEL RATIO	17.09	16.91	12.48	12.55	12.84	12.92
EMISSION RATES, G/HR						
CO	59.1	7.1	6451.4	6332.3	4848.2	4715.9
HC	103.5	50.0	139.1	121.7	122.9	111.3
NOX+	6.4	6.6	111.7	83.0	173.5	113.0
OIL TEMPERATURE, F	192	191	214	215	210	158
OIL PRESSURE, PSI	16	16	22	22	25	18
COOLANT TEMPERATURE, F	183	182	177	186	188	188
EXHAUST PRESSURE, IN. H2O	1.0	.0	15.0	13.0	13.0	8.0
EXHAUST TEMPERATURE, F	531	657	993	955	1012	705

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	7.1	7.2	8.1	8.2	9.1	9.2
TEST DATE	3/11/77	3/11/77	3/11/77	3/11/77	3/11/77	3/11/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	729.1	729.1	729.1	729.1	729.1	729.1
HUMIDITY, GRAINS/LB	54	54	54	54	54	54
TEMPERATURE, F	83	83	81	81	81	81
ENGINE SPEED, RPM	1000	1000	1000	1000	1000	1000
TORQUE, FT-LB	166.0	166.0	133.2	133.2	89.4	89.4
POWER, BHP*	32.3	32.3	25.9	25.9	17.4	17.4
FUEL RATE, LB/HR	15.1	15.1	12.6	12.5	9.4	9.4
IGNITION TIMING, DEG BTDC	12.0	12.0	16.0	16.0	25.0	25.0
MANIFOLD VACUUM, IN HG	4.9	4.9	6.8	6.9	11.0	11.1
THROTTLE ANGLE, DEG	13.0	13.0	10.5	10.5	6.0	6.0
INTAKE MAN. TEMP., F	102	114	122	120	131	133
CONCENTRATIONS, DRY BASIS						
CO, %	.3102	.0545	.0588	.0114	.0554	.0123
CO2, %	13.54	14.28	12.93	13.18	12.93	13.16
O2, %	.89	.61	2.44	2.23	2.46	2.26
HC, PPMC	1539	298	1325	227	1603	258
NOX, PPM	1750	1768	1180	1152	635	602
AIR/FUEL RATIO	15.19	15.24	16.50	16.48	16.47	16.48
EMISSION RATES, G/HR						
CO	292.4	51.1	50.3	9.7	35.4	7.8
HC	72.9	14.0	56.9	9.6	51.4	8.3
NOX+	246.9	248.3	151.0	145.6	60.7	57.4
OIL TEMPERATURE, F	212	212	190	200	205	205
OIL PRESSURE, PSI	24	24	29	27	27	27
COOLANT TEMPERATURE, F	188	186	183	187	185	185
EXHAUST PRESSURE, IN. H2O	13.0	8.0	7.0	7.0	5.0	4.0
EXHAUST TEMPERATURE, F	1018	991	903	838	846	802

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	10.1	10.2	11.1	11.2	12.1	12.2
TEST DATE	3/11/77	3/11/77	3/11/77	3/11/77	3/11/77	3/11/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	729.1	729.1	729.1	729.1	729.1	729.1
HUMIDITY, GRAINS/LB	54	49	49	49	54	49
TEMPERATURE, F	81	80	80	80	79	80
ENGINE SPEED, RPM	1000	1000	1000	1000	1000	1000
TORQUE, FT-LB	54.4	55.1	22.0	22.0	2.7	2.7
POWER, BHP*	10.6	10.7	4.3	4.3	.5	.5
FUEL RATE, LB/HR	7.0	7.0	5.1	5.2	4.4	4.4
IGNITION TIMING, DEG BTDC	26.0	26.0	26.0	26.0	25.0	25.0
MANIFOLD VACUUM, IN HG	16.0	16.0	18.7	18.7	19.7	19.7
THROTTLE ANGLE, DEG	3.5	3.5	2.0	2.0	1.0	1.0
INTAKE MAN. TEMP., F	128	119	116	116	117	118
CONCENTRATIONS, DRY BASIS						
CO, %	.4191	.0502	.4366	.0545	.4896	.0672
CO2, %	12.84	13.34	12.53	13.14	11.00	12.65
O2, %	2.30	1.92	2.80	2.64	4.85	3.05
HC, PPMC	1771	291	2686	454	11389	1830
NOX, PPM	653	597	149	150	54	80
AIR/FUEL RATIO	16.11	16.18	16.38	16.70	16.99	16.89
EMISSION RATES, G/HR						
CO	193.5	23.4	151.2	19.4	151.0	20.4
HC	41.1	6.8	46.7	8.1	176.4	27.8
NOX+	45.2	40.9	7.6	7.8	2.5	3.6
OIL TEMPERATURE, F	204	204	200	200	197	196
OIL PRESSURE, PSI	27	27	28	28	29	30
COOLANT TEMPERATURE, F	184	184	183	183	182	183
EXHAUST PRESSURE, IN. H2O	2.0	2.0	1.0	1.0	1.0	1.0
EXHAUST TEMPERATURE, F	763	759	703	707	621	795

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	13.1	13.2	14.1	14.2	15.1	15.2
TEST DATE	3/15/77	3/15/77	3/11/77	3/11/77	3/11/77	3/11/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	745.3	745.3	729.1	729.1	729.1	729.1
HUMIDITY, GRAINS/LB	51	51	49	49	49	49
TEMPERATURE, F	84	84	88	88	86	86
ENGINE SPEED, RPM	1300	1300	1300	1300	1300	1300
TORQUE, FT-LB	244.1	241.7	221.4	221.4	186.0	186.1
POWER, BHP*	60.4	59.8	56.2	56.2	47.1	47.1
FUEL RATE, LB/HR	30.7	29.8	27.6	27.5	23.5	23.5
IGNITION TIMING, DEG BTDC	14.0	17.0	11.5	11.5	17.0	17.0
MANIFOLD VACUUM, IN HG	.3	.3	2.4	2.4	3.2	3.2
THROTTLE ANGLE, DEG	71.0	71.0	24.0	24.0	16.0	16.0
INTAKE MAN. TEMP., F	88	90	97	98	107	107
CONCENTRATIONS, DRY BASIS						
CO, %	4.4300	4.1400	4.9252	4.9227	5.1292	5.1356
CO2, %	11.78	12.02	11.62	11.65	11.46	11.52
O2, %	.03	.00	.14	.07	.14	.07
HC, PPMC	1720	1492	1984	1787	2122	1893
NOX, PPM	825	688	1059	586	480	472
AIR/FUEL RATIO	12.82	12.94	12.70	12.66	12.58	12.56
EMISSION RATES, G/HR						
CO	7185.9	6570.4	7114.0	7075.9	6271.5	6267.4
HC	140.1	118.9	143.9	129.0	130.3	116.0
NOX+	198.3	161.8	224.7	123.7	86.2	84.7
OIL TEMPERATURE, F	228	230	222	224	222	222
OIL PRESSURE, PSI	27	27	29	28	29	29
COOLANT TEMPERATURE, F	192	189	185	88	186	186
EXHAUST PRESSURE, IN. H2O	25.0	23.0	21.0	19.0	16.0	14.0
EXHAUST TEMPERATURE, F	1148	1078	1099	1018	1018	955

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	16.1	16.2	17.1	17.2	18.1	18.2
TEST DATE	3/11/77	3/11/77	3/11/77	3/11/77	3/11/77	3/11/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	729.1	729.1	729.1	729.1	729.1	729.1
HUMIDITY, GRAINS/LB	48	48	48	48	48	48
TEMPERATURE, F	81	82	80	80	80	80
ENGINE SPEED, RPM	1300	1300	1300	1300	1300	1300
TORQUE, FT-LB	147.5	147.5	98.0	97.9	61.2	61.3
POWER, BHP*	37.2	37.2	24.7	24.7	15.4	15.4
FUEL RATE, LB/HR	16.6	16.7	12.3	12.2	9.8	9.9
IGNITION TIMING, DEG BTDC	22.0	22.0	30.0	30.0	30.0	30.0
MANIFOLD VACUUM, IN HG	7.6	7.7	11.5	11.5	14.0	14.0
THROTTLE ANGLE, DEG	12.5	12.5	8.0	8.0	6.0	6.0
INTAKE MAN. TEMP., F	117	118	135	135	144	145
CONCENTRATIONS, DRY BASIS						
CO, %	.0797	.0134	.0621	.0102	.1175	.0162
CO2, %	13.44	13.73	13.20	13.42	12.66	13.31
O2, %	1.54	1.28	2.00	1.84	2.28	2.04
HC, PPMC	887	135	477	51	172	2
NOX, PPM	2004	2030	956	965	420	425
AIR/FUEL RATIO	15.86	15.78	16.24	16.18	16.50	16.32
EMISSION RATES, G/HR						
CO	86.2	14.4	50.7	8.3	78.5	10.7
HC	48.2	7.3	19.6	2.1	5.8	.1
NOX+	316.2	318.8	113.8	114.2	40.9	41.0
OIL TEMPERATURE, F	195	208	213	213	210	210
OIL PRESSURE, PSI	30	30	29	29	29	29
COOLANT TEMPERATURE, F	184	187	186	186	185	185
EXHAUST PRESSURE, IN. H2O	11.0	10.0	7.0	6.0	5.0	4.0
EXHAUST TEMPERATURE, F	982	931	918	859	883	826

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	19.1	19.2	20.1	20.2	21.1	21.2
TEST DATE	3/14/77	3/14/77	3/14/77	3/14/77	3/14/77	3/14/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	737.9	737.9	737.9	737.9	734.6	734.6
HUMIDITY, GRAINS/LB	49	49	50	50	50	50
TEMPERATURE, F	81	81	83	83	90	90
ENGINE SPEED, RPM	1300	1300	1300	1300	1600	1600
TORQUE, FT-LB	24.2	24.6	2.6	2.6	242.0	242.0
POWER, BHP*	6.0	6.1	.6	.6	75.2	75.2
FUEL RATE, LB/HR	6.6	6.5	5.2	5.2	37.6	35.4
IGNITION TIMING, DEG BTDC	30.0	30.0	30.0	30.0	13.0	13.0
MANIFOLD VACUUM, IN HG	19.8	19.8	20.9	20.9	.4	.5
THROTTLE ANGLE, DEG	2.0	2.0	2.0	2.0	71.0	71.0
INTAKE MAN. TEMP., F	114	113	126	125	93	90
CONCENTRATIONS, DRY BASIS						
CO, %	1.1858	.0195	.5061	.0452	5.3400	5.1700
CO2, %	12.53	13.20	11.62	12.86	11.08	11.16
O2, %	2.57	2.00	3.42	2.32	.07	.00
HC, PPMC	2121	164	8159	1937	1835	1567
NOX, PPM	260	260	90	112	598	490
AIR/FUEL RATIO	15.84	16.28	16.22	16.32	12.45	12.49
EMISSION RATES, G/HR						
CO	507.9	8.4	178.3	15.7	10356.3	9463.5
HC	45.6	3.6	144.4	33.8	178.7	144.1
NOX+	16.4	16.5	4.7	5.7	171.0	132.3
OIL TEMPERATURE, F	205	205	204	204	230	233
OIL PRESSURE, PSI	30	30	30	30	25	30
COOLANT TEMPERATURE, F	184	185	185	185	188	186
EXHAUST PRESSURE, IN. H2O	2.0	1.0	1.0	1.0	35.0	36.0
EXHAUST TEMPERATURE, F	754	727	703	781	1184	1118

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	22.1	22.2	23.1	23.2	24.1	24.2
TEST DATE	3/14/77	3/14/77	3/14/77	3/14/77	3/14/77	3/14/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	734.6	734.6	737.9	737.9	737.9	737.9
HUMIDITY, GRAINS/LB	50	50	50	50	50	50
TEMPERATURE, F	93	93	91	92	92	91
ENGINE SPEED, RPM	1600	1600	1600	1600	1600	1600
TORQUE, FT-LB	217.0	217.1	181.4	181.4	145.3	145.5
POWER, BHP*	67.6	67.6	56.1	56.2	45.0	45.0
FUEL RATE, LB/HR	34.1	33.8	24.9	24.9	20.1	20.2
IGNITION TIMING, DEG BTDC	16.0	16.0	22.0	22.0	28.0	28.0
MANIFOLD VACUUM, IN HG	3.1	3.0	5.5	5.5	8.2	8.3
THROTTLE ANGLE, DEG	26.0	26.0	20.0	20.0	15.0	15.0
INTAKE MAN. TEMP., F	79	102	117	120	130	131
CONCENTRATIONS, DRY BASIS						
CO, %	5.3200	5.5300	1.0701	.4400	.2100	.0401
CO2, %	11.00	11.02	13.42	14.08	13.48	13.67
O2, %	.06	.00	.68	.16	1.30	1.13
HC, PPMC	1950	1140	1316	353	1196	296
NOX, PPM	480	340	1950	825	1925	1950
AIR/FUEL RATIO	12.42	12.38	14.72	14.71	15.58	15.64
EMISSION RATES, G/HR						
CO	9339.1	9577.3	1608.3	657.7	268.9	51.8
HC	171.9	99.2	99.3	26.5	76.9	19.2
NOX+	124.3	86.9	431.8	181.7	363.2	370.9
OIL TEMPERATURE, F	231	231	224	227	227	226
OIL PRESSURE, PSI	30	30	30	30	30	30
COOLANT TEMPERATURE, F	186	188	186	188	186	186
EXHAUST PRESSURE, IN. H2O	32.0	29.0	25.0	22.0	18.0	15.0
EXHAUST TEMPERATURE, F	1168	1096	1168	1203	1105	1075

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	25.1	25.2	26.1	26.2	27.1	27.2
TEST DATE	3/14/77	3/14/77	3/14/77	3/14/77	3/14/77	3/14/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	737.9	737.9	735.0	735.0	735.0	735.0
HUMIDITY, GRAINS/LB	50	50	59	59	59	59
TEMPERATURE, F	86	86	83	83	84	84
ENGINE SPEED, RPM	1600	1600	1600	1600	1600	1600
TORQUE, FT-LB	96.5	96.3	59.8	59.5	24.2	24.3
POWER, BHP*	29.7	29.7	18.5	18.4	7.5	7.5
FUEL RATE, LB/HR	14.9	14.8	12.2	12.1	9.1	9.1
IGNITION TIMING, DEG BTDC	34.0	34.0	34.0	34.0	34.0	34.0
MANIFOLD VACUUM, IN HG	12.3	12.3	14.8	14.8	17.5	17.5
THROTTLE ANGLE, DEG	10.0	10.0	8.0	8.0	5.0	5.0
INTAKE MAN. TEMP., F	143	143	136	139	149	150
CONCENTRATIONS, DRY BASIS						
CO, %	.0796	.0169	.1229	.0263	.2354	.0378
CO2, %	13.27	13.53	12.88	13.14	12.68	13.02
O2, %	1.70	1.50	2.63	2.38	3.10	2.75
HC, PPMC	1164	279	1274	318	2262	408
NOX, PPM	1125	1113	400	425	125	161
AIR/FUEL RATIO	15.92	15.90	16.59	16.55	16.76	16.81
EMISSION RATES, G/HR						
CO	77.7	16.3	102.0	21.6	147.8	23.8
HC	57.1	13.5	53.1	13.1	71.3	12.9
NOX+	161.8	158.3	50.9	53.6	12.0	15.5
OIL TEMPERATURE, F	222	221	206	211	212	212
OIL PRESSURE, PSI	30	30	31	31	31	31
COOLANT TEMPERATURE, F	186	186	188	186	186	186
EXHAUST PRESSURE, IN. H2O	10.0	8.0	6.0	5.0	4.0	3.0
EXHAUST TEMPERATURE, F	1021	955	949	861	942	883

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	28.1	28.2	29.1	29.2	30.1	30.2
TEST DATE	3/14/77	3/14/77	3/14/77	3/14/77	3/14/77	3/14/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	735.0	735.0	735.0	735.0	735.0	735.0
HUMIDITY, GRAINS/LB	59	59	59	59	65	65
TEMPERATURE, F	84	84	93	94	92	93
ENGINE SPEED, RPM	1600	1600	2000	2000	2000	2000
TORQUE, FT-LB	2.5	2.4	244.8	244.1	219.8	220.0
POWER, BHP*	.8	.7	95.4	95.2	85.7	85.9
FUEL RATE, LB/HR	6.5	6.5	46.2	45.7	43.1	43.1
IGNITION TIMING, DEG BTDC	34.0	34.0	19.0	19.0	20.0	20.0
MANIFOLD VACUUM, IN HG	20.9	20.9	.8	.7	2.9	2.9
THROTTLE ANGLE, DEG	3.0	3.0	71.0	71.0	30.0	30.0
INTAKE MAN. TEMP., F	145	140	93	96	101	100
CONCENTRATIONS, DRY BASIS						
CO, %	.4995	.0725	5.2250	5.2565	5.5400	5.7200
CO2, %	12.55	13.00	11.33	11.36	10.90	11.11
O2, %	3.13	2.50	.21	.08	.24	.13
HC, PPMC	2263	442	1834	1606	1887	1548
NOX, PPM	85	113	650	450	460	330
AIR/FUEL RATIO	16.63	16.60	12.60	12.53	12.45	12.38
EMISSION RATES, G/HR						
CO	221.9	32.1	12556.6	12423.4	12311.5	12610.4
HC	50.5	9.8	221.4	190.6	210.6	171.4
NOX+	5.8	7.7	239.4	163.0	160.8	114.5
OIL TEMPERATURE, F	211	210	234	241	230	236
OIL PRESSURE, PSI	31	31	31	31	32	31
COOLANT TEMPERATURE, F	185	185	186	187	188	186
EXHAUST PRESSURE, IN. H2O	2.0	1.0	62.0	55.0	51.0	48.0
EXHAUST TEMPERATURE, F	832	841	1255	1195	1221	1159

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	31.1	31.2	32.1	32.2	33.1	33.2
TEST DATE	3/14/77	3/14/77	3/14/77	3/14/77	3/14/77	3/14/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	735.0	735.0	735.0	735.0	735.0	735.0
HUMIDITY, GRAINS/LB	65	65	65	65	65	65
TEMPERATURE, F	93	93	93	93	89	89
ENGINE SPEED, RPM	2000	2000	2000	2000	2000	2000
TORQUE, FT-LB	184.1	184.0	147.0	146.9	96.4	96.3
POWER, BHP*	71.9	71.8	57.4	57.3	37.5	37.5
FUEL RATE, LB/HR	31.6	31.8	25.7	25.5	18.7	18.7
IGNITION TIMING, DEG BTDC	25.0	25.0	32.0	32.0	37.0	37.0
MANIFOLD VACUUM, IN HG	5.9	5.8	8.7	8.7	13.0	13.0
THROTTLE ANGLE, DEG	22.0	22.0	17.5	17.5	12.0	12.0
INTAKE MAN. TEMP., F	116	119	132	134	143	142
CONCENTRATIONS, DRY BASIS						
CO, %	1.6663	1.6979	.5828	.1534	.1534	.0309
CO2, %	13.27	13.52	13.53	14.27	13.80	14.14
O2, %	.50	.27	1.11	.63	1.39	1.13
HC, PPMC	1422	494	1256	315	1142	275
NOX, PPM	1935	1400	2225	1875	1650	1595
AIR/FUEL RATIO	14.32	14.23	15.25	15.20	15.65	15.60
EMISSION RATES, G/HR						
CO	3090.2	3145.0	934.8	242.5	183.6	36.8
HC	132.4	46.0	101.2	25.0	68.6	16.4
NOX+	564.6	408.0	561.5	466.3	310.7	298.7
OIL TEMPERATURE, F	237	237	235	234	230	229
OIL PRESSURE, PSI	31	31	31	31	32	32
COOLANT TEMPERATURE, F	187	188	186	187	186	187
EXHAUST PRESSURE, IN. H2O	38.0	34.0	28.0	25.0	16.0	13.0
EXHAUST TEMPERATURE, F	1232	1207	1177	1196	1110	1051

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	34.1	34.2	35.1	35.2	36.1	36.2
TEST DATE	3/14/77	3/14/77	3/14/77	3/14/77	3/14/77	3/14/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	735.0	735.0	735.0	735.0	735.0	735.0
HUMIDITY, GRAINS/LB	65	65	65	65	65	65
TEMPERATURE, F	85	85	84	84	84	84
ENGINE SPEED, RPM	2000	2000	2000	2000	2000	2000
TORQUE, FT-LB	61.6	61.6	24.4	24.4	3.1	3.0
POWER, BHP*	23.9	23.9	9.5	9.5	1.2	1.1
FUEL RATE, LB/HR	14.9	14.6	10.7	11.2	8.4	8.5
IGNITION TIMING, DEG BTDC	37.0	37.0	37.0	37.0	37.0	37.0
MANIFOLD VACUUM, IN HG	15.7	15.7	18.2	18.2	20.0	20.0
THROTTLE ANGLE, DEG	9.0	9.0	6.0	6.0	4.5	4.5
INTAKE MAN. TEMP., F	146	147	156	158	160	159
CONCENTRATIONS, DRY BASIS						
CO, %	.1391	.0216	.2326	.0378	.3805	.0607
CO2, %	13.59	13.78	13.00	13.38	12.26	13.01
O2, %	1.84	1.75	2.63	2.40	3.80	2.88
HC, PPMC	969	228	1134	284	4285	850
NOX, PPM	706	700	195	215	70	105
AIR/FUEL RATIO	15.97	16.04	16.51	16.52	16.99	16.84
EMISSION RATES, G/HR						
CO	135.7	20.6	168.9	28.5	223.2	35.6
HC	47.4	10.9	41.4	10.8	126.2	25.0
NOX+	108.3	105.3	22.3	25.5	6.5	9.7
OIL TEMPERATURE, F	225	224	219	218	215	215
OIL PRESSURE, PSI	32	32	32	33	33	33
COOLANT TEMPERATURE, F	186	186	185	185	185	185
EXHAUST PRESSURE, IN. H2O	10.0	8.0	6.0	5.0	4.0	3.0
EXHAUST TEMPERATURE, F	1060	979	1019	937	929	936

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	37.1	37.2	38.1	38.2	39.1	39.2
TEST DATE	3/14/77	3/14/77	3/14/77	3/14/77	3/14/77	3/14/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	735.0	735.0	735.0	735.0	735.0	735.0
HUMIDITY, GRAINS/LB	65	65	65	65	65	65
TEMPERATURE, F	98	98	96	98	96	96
ENGINE SPEED, RPM	2500	2500	2500	2500	2500	2500
TORQUE, FT-LB	241.4	242.4	217.8	217.8	182.6	182.5
POWER, BHP*	118.3	118.8	106.5	106.7	89.3	89.3
FUEL RATE, LB/HR	57.4	57.0	54.3	53.8	39.4	39.6
IGNITION TIMING, DEG BTDC	21.0	21.0	21.0	21.0	28.0	28.0
MANIFOLD VACUUM, IN HG	1.1	1.1	2.7	2.7	6.0	6.0
THROTTLE ANGLE, DEG	71.0	71.0	34.0	34.0	26.0	26.0
INTAKE MAN. TEMP., F	94	95	101	98	115	117
CONCENTRATIONS, DRY BASIS						
CO, %	5.0500	5.0800	5.8500	5.8400	1.6100	1.6300
CO2, %	11.44	11.40	10.91	11.01	13.55	13.53
O2, %	.25	.23	.25	.23	.50	.25
HC, PPMC	1676	1426	1861	1562	1321	563
NOX, PPM	750	450	530	330	2200	1600
AIR/FUEL RATIO	12.71	12.69	12.37	12.39	14.37	14.25
EMISSION RATES, G/HR						
CO	15199.2	15160.6	16259.4	16113.6	3727.7	3755.7
HC	253.4	213.7	259.7	216.5	153.6	65.1
NOX+	355.1	211.3	231.8	143.3	801.4	580.0
OIL TEMPERATURE, F	246	249	247	248	247	247
OIL PRESSURE, PSI	32	32	32	32	32	32
COOLANT TEMPERATURE, F	188	189	188	188	188	188
EXHAUST PRESSURE, IN. H2O	94.0	85.0	82.0	77.0	59.0	55.0
EXHAUST TEMPERATURE, F	1321	1264	1294	1240	1312	1274

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	40.1	40.2	41.1	41.2	42.1	42.2
TEST DATE	3/14/77	3/14/77	3/14/77	3/14/77	3/14/77	3/14/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	735.0	735.0	735.0	735.0	735.0	735.0
HUMIDITY, GRAINS/LB	65	65	65	65	65	65
TEMPERATURE, F	92	93	92	92	89	89
ENGINE SPEED, RPM	2500	2500	2500	2500	2500	2500
TORQUE, FT-LB	144.8	144.7	96.9	96.9	59.5	59.4
POWER, BHP*	70.6	70.6	47.3	47.2	28.9	28.9
FUEL RATE, LB/HR	32.1	32.0	24.1	24.1	18.2	18.2
IGNITION TIMING, DEG BTDC	35.0	35.0	40.0	40.0	40.0	40.0
MANIFOLD VACUUM, IN HG	9.2	9.2	13.4	13.5	16.4	16.4
THROTTLE ANGLE, DEG	21.0	21.0	15.0	15.0	11.0	11.0
INTAKE MAN. TEMP., F	122	123	135	135	142	141
CONCENTRATIONS, DRY BASIS						
CO, %	.6725	.1890	.4265	.1036	.1826	.0447
CO2, %	13.53	14.21	13.80	14.35	13.92	14.11
O2, %	1.27	.75	1.17	.88	1.57	1.46
HC, PPMC	1085	332	1115	327	775	217
NOX, PPM	2542	2000	1900	1650	988	973
AIR/FUEL RATIO	15.35	15.27	15.36	15.38	15.77	15.81
EMISSION RATES, G/HR						
CO	1354.4	376.7	644.9	156.7	214.1	52.5
HC	109.8	33.3	84.7	24.8	45.6	12.8
NOX+	805.3	627.2	452.0	392.6	182.2	179.7
OIL TEMPERATURE, F	231	237	237	237	233	231
OIL PRESSURE, PSI	33	33	33	33	33	33
COOLANT TEMPERATURE, F	187	188	187	188	186	186
EXHAUST PRESSURE, IN. H2O	43.0	39.0	25.0	22.0	15.0	13.0
EXHAUST TEMPERATURE, F	1234	1255	1201	1171	1159	1075

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	43.1	43.2	44.1	44.2	45.1	45.2
TEST DATE	3/14/77	3/14/77	3/14/77	3/14/77	3/17/77	3/17/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	735.0	735.0	735.0	735.0	724.5	724.5
HUMIDITY, GRAINS/LB	65	65	65	65	74	74
TEMPERATURE, F	86	85	85	85	115	115
ENGINE SPEED, RPM	2500	2500	2500	2500	3000	3000
TORQUE, FT-LB	24.4	24.5	3.4	3.5	225.0	225.0
POWER, BHP*	11.9	11.9	1.7	1.7	136.5	136.5
FUEL RATE, LB/HR	13.6	13.6	10.8	10.8	65.5	65.6
IGNITION TIMING, DEG BTDC	40.0	40.0	40.0	40.0	25.0	.0
MANIFOLD VACUUM, IN HG	18.8	18.8	20.2	20.2	1.3	1.3
THROTTLE ANGLE, DEG	8.5	8.5	6.5	6.5	71.0	71.0
INTAKE MAN. TEMP., F	149	149	158	158	102	102
CONCENTRATIONS, DRY BASIS						
CO, %	.1792	.0378	.2752	.0561	4.9500	5.1300
CO2, %	13.40	13.94	12.89	13.29	11.55	11.55
O2, %	2.31	2.13	3.38	2.97	.00	.00
HC, PPMC	569	160	2720	653	1549	1106
NOX, PPM	330	340	118	144	850	388
AIR/FUEL RATIO	16.34	16.28	16.85	16.89	12.62	12.59
EMISSION RATES, G/HR						
CO	162.8	34.1	204.9	42.0	16876.6	17460.1
HC	26.0	7.2	101.7	24.5	265.2	189.0
NOX+	47.2	48.2	13.8	16.9	475.9	216.9
OIL TEMPERATURE, F	227	225	223	222	256	256
OIL PRESSURE, PSI	34	34	34	34	32	32
COOLANT TEMPERATURE, F	186	186	185	185	192	192
EXHAUST PRESSURE, IN. H2O	9.0	7.0	6.0	5.0	113.0	.0
EXHAUST TEMPERATURE, F	1105	1008	1047	994	1383	0

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	47.1	47.2	48.1	48.2	49.1	49.2
TEST DATE	3/15/77	3/15/77	3/15/77	3/15/77	3/15/77	3/15/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	746.0	746.0	745.3	746.0	746.0	746.0
HUMIDITY, GRAINS/LB	56	56	56	56	56	56
TEMPERATURE, F	100	100	99	99	94	96
ENGINE SPEED, RPM	3000	3000	3000	3000	3000	3000
TORQUE, FT-LB	175.0	175.0	130.0	130.0	93.1	93.1
POWER, BHP*	101.4	101.4	75.3	75.2	53.7	53.8
FUEL RATE, LB/HR	48.0	47.9	36.9	36.8	30.1	30.2
IGNITION TIMING, DEG BTDC	31.0	31.0	40.0	40.0	43.0	43.0
MANIFOLD VACUUM, IN HG	5.6	5.6	10.0	10.0	13.8	13.8
THROTTLE ANGLE, DEG	32.0	32.0	25.0	25.0	18.0	18.0
INTAKE MAN. TEMP., F	116	116	127	127	132	132
CONCENTRATIONS, DRY BASIS						
CO, %	1.5300	1.5200	.5754	.0296	.6634	.0852
CO2, %	13.40	13.53	13.53	14.21	13.45	14.09
O2, %	.20	.10	.65	.25	.55	.16
HC, PPMC	1076	241	765	27	87	41
NOX, PPM	2000	1500	2400	1825	1700	950
AIR/FUEL RATIO	14.22	14.23	15.00	15.03	14.93	14.91
EMISSION RATES, G/HR						
CO	4276.0	4240.3	1306.0	66.9	1222.6	157.0
HC	151.0	33.8	87.2	3.1	8.0	3.8
NOX+	846.0	633.4	824.8	624.6	474.2	265.0
OIL TEMPERATURE, F	254	254	251	251	246	237
OIL PRESSURE, PSI	32	32	32	32	33	32
COOLANT TEMPERATURE, F	188	188	188	188	189	189
EXHAUST PRESSURE, IN. H2O	85.0	76.0	57.0	50.0	36.0	31.0
EXHAUST TEMPERATURE, F	1417	1372	1352	1352	1287	1283

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	50.1	50.2	51.1	51.2	52.1	52.2
TEST DATE	3/15/77	3/15/ 7	3/15/77	3/15/77	3/15/77	3/15/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	745.3	745.3	745.3	745.3	745.3	745.3
HUMIDITY, GRAINS/LB	53	53	50	50	50	50
TEMPERATURE, F	89	89	84	84	83	83
ENGINE SPEED, RPM	3000	3000	3000	3000	3000	3000
TORQUE, FT-LB	58.0	58.3	23.0	23.0	3.7	3.7
POWER, BHP*	33.3	33.4	13.1	13.1	2.1	2.1
FUEL RATE, LB/HR	22.9	23.0	16.7	16.8	13.9	13.8
IGNITION TIMING, DEG BTDC	43.0	43.0	43.0	43.0	43.0	43.0
MANIFOLD VACUUM, IN HG	16.6	16.6	19.2	19.2	20.4	20.3
THROTTLE ANGLE, DEG	14.0	14.0	11.0	11.0	9.5	9.5
INTAKE MAN. TEMP., F	135	135	142	142	148	149
CONCENTRATIONS, DRY BASIS						
CO, %	.2327	.0075	.1132	.0075	.1557	.0075
CO2, %	13.67	13.94	13.53	13.67	13.01	13.27
O2, %	1.00	.80	1.40	1.38	2.08	2.00
HC, PPMC	488	40	168	18	340	85
NOX, PPM	988	1001	335	360	170	190
AIR/FUEL RATIO	15.39	15.40	15.76	15.81	16.25	16.28
EMISSION RATES, G/HR						
CO	336.4	10.9	122.2	8.1	144.1	6.9
HC	35.4	2.9	9.1	1.0	15.8	3.9
NOX+	213.2	216.5	53.3	57.6	23.2	25.8
OIL TEMPERATURE, F	230	241	236	234	230	230
OIL PRESSURE, PSI	33	33	34	34	35	35
COOLANT TEMPERATURE, F	190	190	187	186	185	185
EXHAUST PRESSURE, IN. H2O	22.0	19.0	13.0	10.0	10.0	7.0
EXHAUST TEMPERATURE, F	1246	1165	1207	1093	1165	1059

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	53.1	53.2	54.1	54.2	55.1	55.2
TEST DATE	4/18/77	4/18/77	3/16/77	3/16/77	3/16/77	3/16/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	739.4	739.4	752.2	752.2	752.2	752.2
HUMIDITY, GRAINS/LB	68	71	37	37	37	37
TEMPERATURE, F	97	97	96	96	97	97
ENGINE SPEED, RPM	3500	3500	3500	3500	3500	3500
TORQUE, FT-LB	216.0	216.0	194.0	194.0	162.0	162.0
POWER, BHP*	147.3	147.4	129.0	129.0	107.8	107.8
FUEL RATE, LB/HR	75.6	75.5	64.6	65.1	51.5	51.3
IGNITION TIMING, DEG BTDC	28.0	28.0	27.5	27.5	34.0	34.0
MANIFOLD VACUUM, IN HG	1.8	1.8	2.6	2.6	5.8	5.8
THROTTLE ANGLE, DEG	70.0	70.0	43.0	43.0	32.0	32.0
INTAKE MAN. TEMP., F	97	97	96	96	117	117
CONCENTRATIONS, DRY BASIS						
CO, %	5.2040	5.2400	5.0000	4.9400	1.1100	1.0800
CO2, %	11.22	11.33	11.21	11.32	13.53	13.80
O2, %	.05	.03	.05	.03	.50	.23
HC, PPMC	1517	1003	1573	958	687	138
NOX, PPM	625	350	825	462	2100	1700
AIR/FUEL RATIO	12.52	12.55	12.59	12.64	14.64	14.52
EMISSION RATES, G/HR						
CO	20379.9	20502.7	16816.1	16808.3	3426.5	3286.4
HC	298.4	197.1	265.7	163.7	106.5	21.1
NOX+	390.1	221.6	387.5	219.5	905.3	722.5
OIL TEMPERATURE, F	245	255	258	258	257	254
OIL PRESSURE, PSI	33	33	33	33	33	33
COOLANT TEMPERATURE, F	192	192	194	194	192	192
EXHAUST PRESSURE, IN. H2O	212.0	131.0	130.0	52.0	98.0	41.0
EXHAUST TEMPERATURE, F	1426	1354	1430	1323	1466	1333

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	56.1	56.2	57.1	57.2	58.1	58.2
TEST DATE	3/16/77	3/16/77	3/16/77	3/16/77	3/16/77	3/16/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	752.2	752.2	752.2	752.2	752.2	752.2
HUMIDITY, GRAINS/LB	41	41	41	41	41	41
TEMPERATURE, F	105	105	99	99	95	94
ENGINE SPEED, RPM	3500	3500	3500	3500	3500	3500
TORQUE, FT-LB	129.5	129.5	85.8	85.9	54.6	54.7
POWER, BHP*	86.9	86.9	57.3	57.3	36.3	36.4
FUEL RATE, LB/HR	42.5	42.5	34.5	34.3	29.3	29.3
IGNITION TIMING, DEG BTDC	41.0	41.0	45.0	45.0	45.0	45.0
MANIFOLD VACUUM, IN HG	9.4	9.5	14.2	14.2	16.8	16.8
THROTTLE ANGLE, DEG	27.5	27.5	20.5	20.5	17.0	17.0
INTAKE MAN. TEMP., F	128	129	134	132	138	138
CONCENTRATIONS, DRY BASIS						
CO, %	.5333	.0193	.6188	.0700	.5584	.0748
CO2, %	13.67	14.08	13.67	14.38	13.80	14.35
O2, %	.73	.49	.60	.30	.56	.33
HC, PPMC	429	11	615	11	544	13
NOX, PPM	2527	2117	1847	1125	1075	625
AIR/FUEL RATIO	15.11	15.22	14.94	15.02	14.92	15.02
EMISSION RATES, G/HR						
CO	1402.1	51.0	1303.7	147.1	999.7	134.5
HC	56.6	1.5	65.1	1.2	48.9	1.1
NOX+	943.3	794.3	552.5	335.7	273.3	159.6
OIL TEMPERATURE, F	260	260	255	252	248	247
OIL PRESSURE, PSI	33	33	33	33	34	34
COOLANT TEMPERATURE, F	190	191	188	188	186	187
EXHAUST PRESSURE, IN. H2O	72.0	62.0	42.0	36.0	27.0	22.0
EXHAUST TEMPERATURE, F	1422	1409	1354	1331	1309	1271

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	59.1	59.2	60.1	60.2	61.1	61.2
TEST DATE	3/16/77	3/16/77	3/16/77	3/16/77	3/18/77	3/18/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	752.2	752.2	752.2	752.2	739.5	739.5
HUMIDITY, GRAINS/LB	41	41	41	41	50	50
TEMPERATURE, F	88	87	86	85	120	120
ENGINE SPEED, RPM	3500	3500	3500	3500	3800	3800
TORQUE, FT-LB	21.7	21.6	4.1	4.0	200.0	200.0
POWER, BHP*	14.4	14.2	2.7	2.7	150.4	150.4
FUEL RATE, LB/HR	20.3	20.5	16.7	16.7	78.1	77.5
IGNITION TIMING, DEG BTDC	45.0	45.0	45.0	45.0	28.0	28.0
MANIFOLD VACUUM, IN HG	19.2	19.0	20.3	20.3	1.9	1.9
THROTTLE ANGLE, DEG	13.0	13.0	11.5	11.5	70.0	70.0
INTAKE MAN. TEMP., F	146	146	152	152	99	99
CONCENTRATIONS, DRY BASIS						
CO, %	.2335	.0024	.1012	.0024	4.7300	4.6200
CO2, %	13.92	13.98	13.67	13.80	11.78	11.89
O2, %	.88	.99	1.38	1.25	.05	.03
HC, PPMC	194	6	70	3	1838	718
NOX, PPM	475	488	0	275	975	525
AIR/FUEL RATIO	15.31	15.52	15.74	15.71	12.73	12.84
EMISSION RATES, G/HR						
CO	297.2	3.1	108.9	2.6	19376.5	18931.1
HC	12.4	.4	3.8	.1	378.1	147.8
NOX+	85.9	90.2	.0	41.9	588.1	316.8
OIL TEMPERATURE, F	242	239	239	238	256	256
OIL PRESSURE, PSI	34	35	35	35	34	34
COOLANT TEMPERATURE, F	185	185	185	184	194	194
EXHAUST PRESSURE, IN. H2O	16.0	13.0	12.0	9.0	154.0	150.0
EXHAUST TEMPERATURE, F	1273	1147	1230	1114	1453	1550

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	62.1	62.2	63.1	63.2	64.1	64.2
TEST DATE	3/15/77	3/16/77	3/16/77	3/16/77	3/16/77	3/16/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	752.2	752.2	752.2	752.2	752.2	752.2
HUMIDITY, GRAINS/LB	45	45	45	45	41	41
TEMPERATURE, F	114	116	118	118	104	105
ENGINE SPEED, RPM	3800	3800	3800	3800	3800	3800
TORQUE, FT-LB	172.6	172.5	144.0	144.0	115.0	115.0
POWER, BHP*	126.9	127.0	106.2	106.2	83.7	83.8
FUEL RATE, LB/HR	71.5	71.4	52.0	52.0	43.3	43.2
IGNITION TIMING, DEG BTDC	30.0	30.0	35.5	35.5	43.0	43.0
MANIFOLD VACUUM, IN HG	3.6	3.6	6.0	5.9	10.1	10.1
THROTTLE ANGLE, DEG	39.0	39.0	35.0	35.0	27.0	27.0
INTAKE MAN. TEMP., F	105	107	130	131	125	126
CONCENTRATIONS, DRY BASIS						
CO, %	5.3600	5.1500	.7570	.2724	.4570	.0121
CO2, %	11.32	11.55	13.93	14.63	13.67	14.21
O2, %	.05	.03	.30	.05	.80	.50
HC, PPMC	1376	919	482	21	400	14
NOX, PPM	780	515	2300	1000	2650	2350
AIR/FUEL RATIO	12.50	12.62	14.70	14.76	15.20	15.23
EMISSION RATES, G/HR						
CO	19799.3	19136.3	2363.3	850.4	1230.2	32.5
HC	255.3	171.4	75.5	3.2	54.1	1.8
NOX+	416.2	276.5	1037.3	451.0	1012.9	897.4
OIL TEMPERATURE, F	269	269	230	230	261	263
OIL PRESSURE, PSI	33	33	34	34	34	34
COOLANT TEMPERATURE, F	195	193	195	196	194	194
EXHAUST PRESSURE, IN. H2O	133.0	120.0	109.0	95.0	73.0	64.0
EXHAUST TEMPERATURE, F	1442	1381	1513	1504	1421	1405

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	65.1	65.2	66.1	66.2	67.1	67.2
TEST DATE	3/16/77	3/16/77	3/16/77	3/16/77	3/16/77	3/16/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	752.2	752.2	752.2	752.2	752.2	752.2
HUMIDITY, GRAINS/LB	41	41	40	40	40	40
TEMPERATURE, F	99	100	92	93	90	90
ENGINE SPEED, RPM	3800	3800	3800	3800	3800	3800
TORQUE, FT-LB	77.5	77.5	47.9	47.9	19.8	19.9
POWER, BHP*	56.2	56.2	34.5	34.5	14.3	14.3
FUEL RATE, LB/HR	34.6	34.6	27.9	27.7	21.2	21.2
IGNITION TIMING, DEG BTDC	46.0	46.0	46.0	46.0	46.0	46.0
MANIFOLD VACUUM, IN HG	14.3	14.4	16.8	16.8	18.9	18.9
THROTTLE ANGLE, DEG	21.0	21.0	16.5	16.5	13.0	13.0
INTAKE MAN. TEMP., F	133	132	129	131	141	142
CONCENTRATIONS, DRY BASIS						
CO, %	.5333	.0561	.4995	.0470	.2116	.0024
CO2, %	13.96	14.49	13.80	14.51	14.08	14.23
O2, %	.63	.38	.58	.25	.76	.68
HC, PPMC	523	14	515	20	172	6
NOX, PPM	1900	1300	1175	850	575	566
AIR/FUEL RATIO	15.01	15.09	14.97	14.99	15.24	15.30
EMISSION RATES, G/HR						
CO	1129.0	119.1	852.2	79.5	279.2	3.2
HC	55.6	1.5	44.1	1.7	11.4	.4
NOX+	571.2	392.0	282.8	202.9	107.0	105.6
OIL TEMPERATURE, F	259	258	237	251	249	249
OIL PRESSURE, PSI	34	34	36	35	35	35
COOLANT TEMPERATURE, F	189	189	192	192	189	189
EXHAUST PRESSURE, IN. H2O	46.0	38.0	29.0	24.0	19.0	15.0
EXHAUST TEMPERATURE, F	1375	1351	1292	1255	1294	1192

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	68.1	68.2	69.1	69.2	70.1	70.2
TEST DATE	3/16/77	3/16/77	3/15/77	3/15/77	3/15/77	3/15/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	752.2	752.2	750.0	750.0	750.0	750.0
HUMIDITY, GRAINS/LB	40	40	44	46	46	46
TEMPERATURE, F	87	86	81	80	80	80
ENGINE SPEED, RPM	3800	3800	800	800	800	800
TORQUE, FT-LB	3.8	3.8	1.7	1.7	15.0	15.0
POWER, BHP*	2.7	2.7	.3	.3	2.3	2.3
FUEL RATE, LB/HR	17.8	17.8	3.6	3.7	4.2	4.3
IGNITION TIMING, DEG BTDC	46.0	46.0	25.0	25.0	25.0	25.0
MANIFOLD VACUUM, IN HG	20.1	20.1	19.2	19.2	18.7	18.8
THROTTLE ANGLE, DEG	11.5	11.5	.0	.0	.5	.5
INTAKE MAN. TEMP., F	150	150	119	114	122	117
CONCENTRATIONS, DRY BASIS						
CO, %	.1060	.0025	.4655	.0024	.5165	.0024
CO2, %	13.80	13.99	10.50	12.14	11.78	12.75
O2, %	1.06	1.06	6.00	3.63	3.63	2.58
HC, PPMC	75	2	19429	112	5618	192
NOX, PPM	325	340	33	60	64	89
AIR/FUEL RATIO	15.51	15.57	16.91	17.73	16.67	16.77
EMISSION RATES, G/HR						
CO	119.5	2.8	119.9	.6	149.9	.7
HC	4.3	.1	251.4	1.5	81.9	2.8
NOX+	51.7	54.3	1.2	2.3	2.7	3.8
OIL TEMPERATURE, F	247	246	193	188	192	192
OIL PRESSURE, PSI	35	35	22	23	23	23
COOLANT TEMPERATURE, F	188	188	174	174	182	182
EXHAUST PRESSURE, IN. H2O	14.0	11.0	1.0	1.0	1.0	1.0
EXHAUST TEMPERATURE, F	1258	1138	504	939	598	778

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	71.1	71.2	72.1	72.2	73.1	73.2
TEST DATE	3/15/77	3/15/77	3/15/77	3/15/77	3/15/77	3/15/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	750.0	750.0	750.0	750.0	750.0	750.0
HUMIDITY, GRAINS/LB	47	47	47	47	47	47
TEMPERATURE, F	80	80	80	79	79	80
ENGINE SPEED, RPM	800	800	600	600	1000	1000
TORQUE, FT-LB	30.2	30.2	31.9	31.9	166.7	166.4
POWER, BHP*	4.5	4.5	3.6	3.6	31.4	31.3
FUEL RATE, LB/HR	4.8	4.6	3.8	3.9	15.6	15.7
IGNITION TIMING, DEG BTDC	25.0	25.0	25.0	25.0	12.0	12.0
MANIFOLD VACUUM, IN HG	18.5	17.8	16.2	16.3	5.2	5.5
THROTTLE ANGLE, DEG	1.0	1.0	.0	.0	13.0	13.0
INTAKE MAN. TEMP., F	114	107	107	105	104	106
CONCENTRATIONS, DRY BASIS						
CO, %	.4740	.0000	.3140	.0000	.3650	.0000
CO2, %	12.27	13.01	11.66	12.50	13.40	14.08
O2, %	2.88	2.25	3.88	3.00	1.13	.65
HC, PPMC	2934	204	5605	226	1370	80
NOX, PPM	138	138	113	123	1700	1575
AIR/FUEL RATIO	16.41	16.49	17.03	17.14	15.35	15.31
EMISSION RATES, G/HR						
CO	152.8	.0	84.4	.0	359.1	.0
HC	47.5	3.2	75.7	3.1	67.7	3.9
NOX+	6.5	6.2	4.4	4.9	242.8	224.5
OIL TEMPERATURE, F	192	192	190	189	206	209
OIL PRESSURE, PSI	22	22	15	15	25	26
COOLANT TEMPERATURE, F	182	182	180	179	188	188
EXHAUST PRESSURE, IN. H2O	1.0	1.0	1.0	1.0	10.0	8.0
EXHAUST TEMPERATURE, F	591	665	523	673	973	940

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	74.1	74.2	75.1	75.2	76.1	76.2
TEST DATE	3/15/77	3/15/77	3/15/77	3/15/77	3/16/77	3/16/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	750.0	750.0	750.0	750.0	752.2	752.2
HUMIDITY, GRAINS/LB	47	47	47	47	41	41
TEMPERATURE, F	80	80	79	80	85	84
ENGINE SPEED, RPM	1000	1000	1000	1000	1000	1000
TORQUE, FT-LB	88.0	87.8	55.5	55.6	22.6	22.6
POWER, BHP*	16.6	16.5	10.4	10.5	4.3	4.3
FUEL RATE, LB/HR	9.5	9.4	7.2	7.3	5.3	5.3
IGNITION TIMING, DEG BTDC	26.0	26.0	27.0	27.0	26.0	26.0
MANIFOLD VACUUM, IN HG	11.3	11.2	16.5	16.5	18.7	18.7
THROTTLE ANGLE, DEG	6.0	6.0	3.0	3.0	2.5	.5
INTAKE MAN. TEMP., F	123	124	111	108	155	149
CONCENTRATIONS, DRY BASIS						
CO, %	.0916	.0000	.3753	.0000	.2712	.0000
CO2, %	12.76	13.01	12.75	13.37	12.35	12.75
O2, %	2.57	2.39	2.15	1.83	3.11	2.73
HC, PPMC	1628	82	1614	83	2256	104
NOX, PPM	475	463	588	500	147	170
AIR/FUEL RATIO	16.54	16.62	16.06	16.16	16.79	16.91
EMISSION RATES, G/HR						
CO	59.4	.0	179.1	.0	100.1	.0
HC	53.0	2.6	38.7	2.0	41.8	1.9
NOX+	44.7	43.2	40.7	35.3	7.7	9.0
OIL TEMPERATURE, F	207	206	201	201	214	207
OIL PRESSURE, PSI	24	25	25	26	25	26
COOLANT TEMPERATURE, F	183	183	181	181	176	176
EXHAUST PRESSURE, IN. H2O	5.0	4.0	2.0	2.0	2.0	1.0
EXHAUST TEMPERATURE, F	850	840	736	740	727	911

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	77.1	77.2	78.1	78.2	79.1	79.2
TEST DATE	3/16/77	3/16/77	3/16/77	3/16/77	3/16/77	3/16/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	752.2	752.2	752.2	752.2	743.0	743.0
HUMIDITY, GRAINS/LB	41	41	41	41	42	42
TEMPERATURE, F	84	83	84	85	80	80
ENGINE SPEED, RPM	1000	1000	1300	1300	1300	1300
TORQUE, FT-LB	.7	.8	184.9	184.9	98.4	98.4
POWER, BHP*	.1	.1	45.2	45.3	24.3	24.3
FUEL RATE, LB/HR	4.4	4.2	21.2	21.1	12.8	12.7
IGNITION TIMING, DEG BTDC	26.0	26.0	17.0	17.0	30.0	30.0
MANIFOLD VACUUM, IN HG	19.9	19.9	5.1	5.3	11.4	11.4
THROTTLE ANGLE, DEG	2.0	2.0	18.0	18.0	9.0	9.0
INTAKE MAN. TEMP., F	143	138	110	110	135	134
CONCENTRATIONS, DRY BASIS						
CO, %	.3090	.0023	1.0600	.4400	.0653	.0000
CO2, %	10.60	12.26	13.27	14.35	12.88	13.14
O2, %	5.53	3.36	.78	.09	2.33	2.07
HC, PPMC	11357	214	1599	72	1217	52
NOX, PPM	34	74	1700	700	775	754
AIR/FUEL RATIO	17.75	17.47	14.75	14.69	16.42	16.38
EMISSION RATES, G/HR						
CO	100.6	.7	1356.1	555.1	56.4	.0
HC	185.6	3.3	102.8	4.6	52.8	2.2
NOX+	1.6	3.2	308.8	125.4	95.3	91.5
OIL TEMPERATURE, F	199	196	211	216	191	201
OIL PRESSURE, PSI	28	28	28	28	30	29
COOLANT TEMPERATURE, F	174	174	187	188	185	185
EXHAUST PRESSURE, IN. H2O	1.0	1.0	15.0	13.0	6.0	5.0
EXHAUST TEMPERATURE, F	612	829	1060	1099	910	829

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	80.1	80.2	81.1	81.2	82.1	82.2
TEST DATE	3/16/77	3/16/77	3/16/77	3/16/77	3/16/77	3/16/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	743.0	743.0	743.0	743.0	743.0	743.0
HUMIDITY, GRAINS/LB	42	42	42	42	42	42
TEMPERATURE, F	81	81	81	81	81	81
ENGINE SPEED, RPM	1300	1300	1300	1300	1300	1300
TORQUE, FT-LB	62.5	62.4	24.7	24.7	1.3	1.3
POWER, BHP*	15.4	15.4	6.1	6.1	.3	.3
FUEL RATE, LB/HR	10.2	10.2	6.7	6.7	5.4	5.5
IGNITION TIMING, DEG BTDC	30.0	30.0	30.0	30.0	30.0	30.0
MANIFOLD VACUUM, IN HG	14.0	14.1	19.6	19.6	21.0	21.0
THROTTLE ANGLE, DEG	6.5	6.5	3.0	3.0	2.0	2.0
INTAKE MAN. TEMP., F	140	140	134	128	123	121
CONCENTRATIONS, DRY BASIS						
CO, %	.1132	.0000	.4910	.0000	.5333	.0024
CO2, %	12.88	13.25	12.75	13.27	11.88	13.10
O2, %	2.50	2.17	2.25	1.96	3.56	2.33
HC, PPMC	1585	66	1502	69	6749	142
NOX, PPM	295	325	246	255	68	98
AIR/FUEL RATIO	16.45	16.43	16.06	16.26	16.45	16.54
EMISSION RATES, G/HR						
CO	78.1	.0	217.8	.0	196.9	.9
HC	54.9	2.3	33.5	1.6	125.1	2.6
NOX+	29.0	31.8	15.6	16.3	3.6	5.2
OIL TEMPERATURE, F	205	206	206	204	201	201
OIL PRESSURE, PSI	29	29	29	29	29	29
COOLANT TEMPERATURE, F	183	183	181	181	180	180
EXHAUST PRESSURE, IN. H2O	5.0	4.0	2.0	1.0	2.0	1.0
EXHAUST TEMPERATURE, F	890	832	793	799	715	792

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	83.1	83.2	84.1	84.2	85.1	85.2
TEST DATE	3/16/77	3/16/77	3/16/77	3/16/77	3/16/77	3/16/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	743.0	743.0	743.0	743.0	743.0	743.0
HUMIDITY, GRAINS/LB	42	42	42	42	42	42
TEMPERATURE, F	87	87	83	83	82	82
ENGINE SPEED, RPM	1600	1600	1600	1600	1600	1600
TORQUE, FT-LB	181.6	181.3	96.2	96.2	60.6	60.6
POWER, BHP*	55.5	55.4	29.3	29.3	18.5	18.4
FUEL RATE, LB/HR	24.8	24.8	15.1	15.1	12.2	12.2
IGNITION TIMING, DEG BTDC	23.0	23.0	34.0	34.0	34.0	34.0
MANIFOLD VACUUM, IN HG	6.1	6.0	12.8	12.7	15.2	15.2
THROTTLE ANGLE, DEG	19.0	19.0	10.0	10.0	8.0	8.0
INTAKE MAN. TEMP., F	107	111	132	133	138	138
CONCENTRATIONS, DRY BASIS						
CO, %	.7760	.0240	.0724	.0000	.1277	.0000
CO2, %	13.49	14.49	13.27	13.57	13.09	13.14
O2, %	1.00	.25	1.71	1.58	2.25	2.06
HC, PPMC	1144	37	994	68	1163	72
NOX, PPM	2050	1040	1150	1150	450	465
AIR/FUEL RATIO	15.09	15.00	15.96	15.99	16.29	16.36
EMISSION RATES, G/HR						
CO	1187.9	36.4	71.6	.0	103.9	.0
HC	87.9	2.8	49.3	3.4	47.5	3.0
NOX+	447.2	224.5	162.0	161.8	52.2	54.1
OIL TEMPERATURE, F	219	224	221	219	216	213
OIL PRESSURE, PSI	30	29	30	30	30	30
COOLANT TEMPERATURE, F	188	189	183	183	183	183
EXHAUST PRESSURE, IN. H2O	22.0	18.0	9.0	7.0	6.0	5.0
EXHAUST TEMPERATURE, F	1129	1171	1015	976	970	906

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	86.1	86.2	87.1	87.2	88.1	88.2
TEST DATE	3/16/77	3/16/77	3/16/77	3/16/77	3/17/77	3/17/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	743.0	743.0	743.0	743.0	733.9	733.9
HUMIDITY, GRAINS/LB	42	42	42	42	46	46
TEMPERATURE, F	82	82	79	80	92	92
ENGINE SPEED, RPM	1600	1600	1600	1600	2000	2000
TORQUE, FT-LB	24.6	24.7	1.3	1.4	184.0	184.0
POWER, BHP*	7.5	7.5	.4	.4	71.5	71.5
FUEL RATE, LB/HR	8.9	8.9	6.7	6.7	31.9	31.9
IGNITION TIMING, DEG BTDC	34.0	34.0	34.0	34.0	26.0	26.0
MANIFOLD VACUUM, IN HG	18.1	18.1	21.4	21.4	5.9	5.9
THROTTLE ANGLE, DEG	5.0	5.0	3.0	3.0	23.0	23.0
INTAKE MAN. TEMP., F	146	146	117	122	118	118
CONCENTRATIONS, DRY BASIS						
CO, %	.2724	.0000	.4570	.0023	1.5400	1.5200
CO2, %	12.62	13.14	12.38	13.14	13.26	13.53
O2, %	2.65	2.26	2.87	2.25	.30	.05
HC, PPMC	2148	128	2597	193	607	187
NOX, PPM	150	175	84	119	1975	530
AIR/FUEL RATIO	16.42	16.49	16.44	16.47	14.32	14.17
EMISSION RATES, G/HR						
CO	163.3	.0	208.2	1.0	2884.9	2812.6
HC	64.7	3.9	59.4	4.4	57.1	17.3
NOX+	12.8	15.1	5.5	7.7	534.8	141.8
OIL TEMPERATURE, F	210	209	177	191	237	237
OIL PRESSURE, PSI	31	31	33	32	31	31
COOLANT TEMPERATURE, F	181	181	171	182	189	189
EXHAUST PRESSURE, IN. H2O	4.0	3.0	2.0	1.0	35.0	30.0
EXHAUST TEMPERATURE, F	926	889	734	616	1234	1211

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	89.1	89.2	90.1	90.2	91.1	91.2
TEST DATE	3/17/77	3/17/77	3/17/77	3/17/77	3/17/77	3/17/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	733.9	733.9	733.9	733.9	733.9	733.9
HUMIDITY, GRAINS/LB	46	46	47	47	54	54
TEMPERATURE, F	81	81	83	83	82	82
ENGINE SPEED, RPM	2000	2000	2000	2000	2000	2000
TORQUE, FT-LB	97.8	97.8	61.2	61.2	24.4	24.4
POWER, BHP*	37.6	37.6	23.6	23.6	9.4	9.4
FUEL RATE, LB/HR	19.1	19.0	14.8	14.8	11.0	11.1
IGNITION TIMING, DEG BTDC	37.5	37.5	37.0	37.0	37.0	37.0
MANIFOLD VACUUM, IN HG	12.8	12.8	15.5	15.5	18.0	18.0
THROTTLE ANGLE, DEG	11.0	11.0	9.0	9.0	6.0	6.0
INTAKE MAN. TEMP., F	125	125	140	140	151	151
CONCENTRATIONS, DRY BASIS						
CO, %	.1263	.0075	.1127	.0075	.1954	.0075
CO2, %	13.40	13.60	13.00	13.26	12.62	12.87
O2, %	1.25	1.00	1.75	1.60	2.40	2.15
HC, PPMC	967	49	737	40	1469	77
NOX, PPM	1662	1662	710	700	240	250
AIR/FUEL RATIO	15.61	15.58	16.00	16.01	16.37	16.45
EMISSION RATES, G/HR						
CO	154.8	9.1	109.6	7.3	144.6	5.6
HC	59.5	3.0	36.0	1.9	54.6	2.9
NOX+	294.4	291.1	100.5	99.4	26.6	28.1
OIL TEMPERATURE, F	224	224	223	223	215	215
OIL PRESSURE, PSI	32	32	32	32	32	32
COOLANT TEMPERATURE, F	186	186	184	184	184	184
EXHAUST PRESSURE, IN. H2O	14.0	11.0	9.0	7.0	5.0	4.0
EXHAUST TEMPERATURE, F	1085	1005	1053	986	1000	921

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	92.1	92.2	93.1	93.2	94.1	94.2
TEST DATE	3/17/77	3/17/77	3/17/77	3/17/77	3/17/77	3/17/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	733.9	733.9	733.9	733.9	733.9	733.9
HUMIDITY, GRAINS/LB	54	54	64	64	64	64
TEMPERATURE, F	82	82	98	98	92	92
ENGINE SPEED, RPM	2000	2000	2500	2500	2500	2500
TORQUE, FT-LB	1.4	1.4	181.8	181.8	96.9	96.9
POWER, BHP*	.5	.5	89.2	89.2	47.3	47.3
FUEL RATE, LB/HR	8.8	8.7	40.6	40.3	24.5	24.3
IGNITION TIMING, DEG BTDC	37.5	37.5	28.0	28.0	40.0	40.0
MANIFOLD VACUUM, IN HG	19.7	19.7	5.7	5.7	13.2	13.2
THROTTLE ANGLE, DEG	4.0	4.0	25.5	25.5	14.0	14.0
INTAKE MAN. TEMP., F	154	154	116	116	138	139
CONCENTRATIONS, DRY BASIS						
CO, %	.3756	.0075	1.8400	1.9500	.5584	.0223
CO2, %	11.55	12.62	13.13	13.13	13.66	14.35
O2, %	3.80	2.50	.15	.05	.55	.20
HC, PPMC	6722	169	1102	459	949	29
NOX, PPM	105	130	1750	1575	1725	1225
AIR/FUEL RATIO	16.79	16.73	14.04	13.98	14.89	14.98
EMISSION RATES, G/HR						
CO	229.9	4.5	4299.7	4499.8	832.7	33.2
HC	206.7	5.1	129.4	53.1	71.1	2.1
NOX+	9.6	11.7	638.9	567.8	401.9	284.8
OIL TEMPERATURE, F	212	212	244	244	238	238
OIL PRESSURE, PSI	32	32	32	32	32	32
COOLANT TEMPERATURE, F	181	181	191	191	186	186
EXHAUST PRESSURE, IN. H2O	4.0	3.0	54.0	47.0	24.0	20.0
EXHAUST TEMPERATURE, F	905	952	1311	1253	1200	1195

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	95.1	95.2	96.1	96.2	97.1	97.2
TEST DATE	3/17/77	3/17/77	3/17/77	3/17/77	3/17/77	3/17/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	733.9	733.9	733.1	733.9	733.9	733.9
HUMIDITY, GRAINS/LB	64	64	65	65	65	65
TEMPERATURE, F	85	85	82	82	82	82
ENGINE SPEED, RPM	2500	2500	2500	2500	2500	2500
TORQUE, FT-LB	60.6	60.6	24.2	24.2	1.5	1.5
POWER, BHP*	29.4	29.4	11.7	11.7	.7	.7
FUEL RATE, LB/HR	18.6	18.7	13.9	13.8	11.3	10.4
IGNITION TIMING, DEG BTDC	40.0	40.0	40.0	40.0	40.0	40.0
MANIFOLD VACUUM, IN HG	16.1	16.1	18.4	18.4	19.7	19.7
THROTTLE ANGLE, DEG	11.0	11.0	7.0	7.0	7.0	7.0
INTAKE MAN. TEMP., F	138	138	140	140	144	144
CONCENTRATIONS, DRY BASIS						
CO, %	.1671	.0075	.1534	.0075	.2875	.0075
CO2, %	13.53	13.80	13.00	13.00	11.55	12.75
O2, %	1.00	.85	1.75	1.75	3.75	2.48
HC, PPMC	570	29	408	23	5599	260
NOX, PPM	950	975	350	325	138	170
AIR/FUEL RATIO	15.42	15.44	16.00	16.14	16.96	16.69
EMISSION RATES, G/HR						
CO	197.0	8.9	140.2	6.9	228.0	5.3
HC	33.7	1.7	18.7	1.0	223.0	9.3
NOX+	175.0	180.2	50.4	47.0	17.2	19.1
OIL TEMPERATURE, F	238	229	221	221	220	220
OIL PRESSURE, PSI	33	33	33	33	34	34
COOLANT TEMPERATURE, F	185	185	186	186	187	186
EXHAUST PRESSURE, IN. H2O	14.0	11.0	8.0	6.0	7.0	5.0
EXHAUST TEMPERATURE, F	1158	1080	1093	965	999	1022

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	98.1	98.2	99.1	99.2	100.1	100.2
TEST DATE	3/17/77	3/17/77	3/17/77	3/17/77	3/17/77	3/17/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	733.9	733.9	733.9	733.9	733.9	733.9
HUMIDITY, GRAINS/LB	70	70	70	70	70	70
TEMPERATURE, F	102	102	95	95	91	91
ENGINE SPEED, RPM	3000	3000	3000	3000	3000	3000
TORQUE, FT-LB	175.0	175.0	93.0	93.0	58.0	58.0
POWER, BHP*	103.5	103.5	54.7	54.7	34.0	34.0
FUEL RATE, LB/HR	48.2	48.2	29.7	29.8	23.1	23.2
IGNITION TIMING, DEG BTDC	31.0	31.0	43.0	43.0	43.0	43.0
MANIFOLD VACUUM, IN HG	5.4	5.4	13.3	13.3	16.0	16.0
THROTTLE ANGLE, DEG	30.5	30.5	18.0	18.0	14.5	14.5
INTAKE MAN. TEMP., F	110	110	131	131	137	137
CONCENTRATIONS, DRY BASIS						
CO, %	2.0800	2.2200	.9465	.3985	.4490	.0193
CO2, %	13.14	13.14	13.67	14.35	13.80	14.35
O2, %	.25	.15	.50	.15	.50	.15
HC, PPMC	1205	603	945	40	658	21
NOX, PPM	1750	1400	1750	575	1000	750
AIR/FUEL RATIO	14.00	13.92	14.68	14.75	14.91	14.93
EMISSION RATES, G/HR						
CO	5744.5	6105.0	1687.8	712.9	633.6	27.3
HC	167.1	83.3	84.6	3.6	46.6	1.5
NOX+	777.6	619.4	502.1	165.5	227.0	170.5
OIL TEMPERATURE, F	244	244	245	246	239	238
OIL PRESSURE, PSI	32	32	32	32	33	33
COOLANT TEMPERATURE, F	191	191	188	188	186	186
EXHAUST PRESSURE, IN. H2O	75.0	66.0	34.0	28.0	21.0	17.0
EXHAUST TEMPERATURE, F	1370	1291	1279	1281	1244	1204

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	101.1	101.2	102.1	102.2	103.1	103.2
TEST DATE	3/17/77	3/17/77	3/17/77	3/17/77	3/17/77	3/17/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	724.5	724.5	724.5	724.5	724.5	724.5
HUMIDITY, GRAINS/LB	66	66	66	66	66	66
TEMPERATURE, F	85	85	85	85	110	110
ENGINE SPEED, RPM	3000	3000	3000	3000	3500	3500
TORQUE, FT-LB	23.2	23.2	1.9	1.9	162.0	162.0
POWER, BHP*	13.7	13.7	1.1	1.1	114.0	114.0
FUEL RATE, LB/HR	17.2	17.1	13.8	13.8	55.2	55.1
IGNITION TIMING, DEG BTDC	43.0	43.0	43.0	43.0	32.0	32.0
MANIFOLD VACUUM, IN HG	18.4	18.4	19.8	19.8	5.1	5.1
THROTTLE ANGLE, DEG	11.0	11.0	9.0	9.0	33.0	33.0
INTAKE MAN. TEMP., F	144	144	151	151	117	117
CONCENTRATIONS, DRY BASIS						
CO, %	.1650	.0024	.2116	.0024	2.5300	2.5600
CO2, %	13.80	14.08	13.40	13.67	12.88	13.01
O2, %	.80	.75	1.50	1.25	.00	.00
HC, PPMC	274	13	683	19	1234	655
NOX, PPM	400	400	190	195	1575	1138
AIR/FUEL RATIO	15.28	15.35	15.72	15.71	13.64	13.68
EMISSION RATES, G/HR						
CO	177.4	2.6	188.6	2.1	7810.9	7896.3
HC	14.8	.7	30.6	.9	191.3	101.5
NOX+	68.1	68.0	26.8	27.5	769.4	555.4
OIL TEMPERATURE, F	232	232	230	230	258	259
OIL PRESSURE, PSI	33	33	34	34	32	32
COOLANT TEMPERATURE, F	184	184	184	184	193	193
EXHAUST PRESSURE, IN. H2O	12.0	10.0	9.0	7.0	97.0	86.0
EXHAUST TEMPERATURE, F	1201	1106	1170	1079	1428	1355

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	104.1	104.2	105.1	105.2	106.1	106.2
TEST DATE	3/17/77	3/17/77	3/17/77	3/17/77	3/17/77	3/17/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	724.5	724.5	724.5	724.5	724.5	724.5
HUMIDITY, GRAINS/LB	66	66	66	66	74	74
TEMPERATURE, F	100	100	95	95	89	90
ENGINE SPEED, RPM	3500	3500	3500	3500	3500	3500
TORQUE, FT-LB	86.0	86.0	54.0	54.0	21.6	21.6
POWER, BHP*	60.0	60.0	37.5	37.5	14.9	15.0
FUEL RATE, LB/HR	34.1	34.0	27.2	27.0	20.3	20.2
IGNITION TIMING, DEG BTDC	45.0	45.0	45.0	45.0	45.0	45.0
MANIFOLD VACUUM, IN HG	13.2	13.2	16.0	16.0	18.3	18.3
THROTTLE ANGLE, DEG	20.5	20.5	16.0	16.0	13.0	13.0
INTAKE MAN. TEMP., F	131	131	137	137	144	144
CONCENTRATIONS, DRY BASIS						
CO, %	.9125	.5285	.8344	.3985	.3994	.0470
CO2, %	13.80	14.35	13.94	14.49	14.08	14.49
O2, %	.33	.00	.25	.00	.49	.25
HC, PPMC	818	49	775	38	373	10
NOX, PPM	1850	775	1038	338	460	320
AIR/FUEL RATIO	14.60	14.60	14.56	14.64	14.94	14.97
EMISSION RATES, G/HR						
CO	1856.6	1070.5	1347.4	642.7	494.3	57.9
HC	83.6	5.0	62.8	3.1	23.2	.6
NOX+	595.6	248.4	265.2	86.2	93.5	64.7
OIL TEMPERATURE, F	254	254	248	248	241	241
OIL PRESSURE, PSI	33	33	33	33	34	34
COOLANT TEMPERATURE, F	188	188	187	186	184	185
EXHAUST PRESSURE, IN. H2O	44.0	37.0	28.0	23.0	17.0	13.0
EXHAUST TEMPERATURE, F	1343	1326	1301	1270	1273	1196

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	107.1	107.2	108.1	108.2	109.1	109.2
TEST DATE	3/17/77	3/17/77	3/17/77	3/17/77	3/17/77	3/17/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	724.0	724.5	724.5	724.5	724.5	724.5
HUMIDITY, GRAINS/LB	75	74	74	74	74	74
TEMPERATURE, F	86	86	110	110	101	101
ENGINE SPEED, RPM	3500	3500	3800	3800	3800	3800
TORQUE, FT-LB	2.5	2.5	144.0	144.0	77.2	77.2
POWER, BHP*	1.7	1.7	110.2	110.2	58.6	58.6
FUEL RATE, LB/HR	16.6	16.6	54.3	54.2	35.2	35.2
IGNITION TIMING, DEG BTDC	45.0	45.0	35.0	35.0	46.0	46.0
MANIFOLD VACUUM, IN HG	19.6	19.6	5.7	5.7	13.4	13.4
THROTTLE ANGLE, DEG	11.0	11.0	32.0	32.0	21.0	21.0
INTAKE MAN. TEMP., F	151	151	121	120	132	132
CONCENTRATIONS, DRY BASIS						
CO, %	.1603	.0024	1.6800	1.7700	.9125	.5840
CO2, %	14.08	14.21	13.40	13.53	13.80	14.35
O2, %	.75	.65	.15	.00	.25	.00
HC, PPMC	149	6	947	389	789	58
NOX, PPM	250	240	1800	1450	1700	850
AIR/FUEL RATIO	15.25	15.27	14.13	14.05	14.55	14.58
EMISSION RATES, G/HR						
CO	166.0	2.5	5280.1	5510.9	1909.7	1220.9
HC	7.7	.3	149.4	60.8	82.9	6.0
NOX+	42.5	40.7	929.1	741.4	584.3	291.8
OIL TEMPERATURE, F	238	238	259	260	259	259
OIL PRESSURE, PSI	34	34	34	34	344	34
COOLANT TEMPERATURE, F	184	184	192	192	188	188
EXHAUST PRESSURE, IN. H2O	12.0	9.0	101.0	89.0	47.0	40.0
EXHAUST TEMPERATURE, F	1238	1141	1459	1376	1374	1352

* CORRECTED SAE J816B

+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	110.1	110.2	111.1	111.2	112.1	112.2
TEST DATE	3/17/77	3/17/77	3/17/77	3/17/77	3/17/77	3/17/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	724.5	724.5	724.5	724.5	724.5	724.5
HUMIDITY, GRAINS/LB	74	74	74	74	74	74
TEMPERATURE, F	96	96	90	90	87	87
ENGINE SPEED, RPM	3800	3800	3800	3800	3800	3800
TORQUE, FT-LB	48.3	48.3	19.3	19.3	3.0	3.0
POWER, BHP*	36.5	36.5	14.5	14.5	2.2	2.2
FUEL RATE, LB/HR	28.1	28.2	21.5	21.5	18.1	18.2
IGNITION TIMING, DEG BTDC	46.0	46.0	46.0	46.0	46.0	46.0
MANIFOLD VACUUM, IN HG	16.0	16.0	18.2	18.2	19.3	19.3
THROTTLE ANGLE, DEG	17.0	17.0	13.5	13.5	12.0	12.0
INTAKE MAN. TEMP., F	136	137	142	142	148	148
CONCENTRATIONS, DRY BASIS						
CO, %	.8805	.5982	.4236	.0561	.1627	.0121
CO2, %	13.94	14.35	14.08	14.49	14.08	14.35
O2, %	.25	.00	.38	.15	.63	.45
HC, PPMC	847	58	388	9	172	5
NOX, PPM	1075	475	488	313	285	255
AIR/FUEL RATIO	14.54	14.56	14.85	14.90	15.16	15.12
EMISSION RATES, G/HR						
CO	1467.2	1000.1	551.5	73.3	182.7	13.6
HC	70.9	4.8	25.3	.6	9.7	.3
NOX+	294.2	130.4	104.3	67.2	52.6	47.0
OIL TEMPERATURE, F	253	253	246	246	243	243
OIL PRESSURE, PSI	34	34	35	35	35	35
COOLANT TEMPERATURE, F	186	186	184	184	184	184
EXHAUST PRESSURE, IN. H2O	31.0	25.0	19.0	15.0	14.0	11.0
EXHAUST TEMPERATURE, F	1327	1295	1301	1301	1274	1182

* CORRECTED SAE J8168

+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	113.1	113.2	128.1	128.2	129.1	129.2
TEST DATE	3/18/77	3/18/77	3/31/77	3/31/77	3/31/77	3/31/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	739.5	739.5	748.1	748.1	748.1	748.1
HUMIDITY, GRAINS/LB	50	50	44	44	44	44
TEMPERATURE, F	93	93	79	79	78	78
ENGINE SPEED, RPM	4000	4000	800	800	1000	1000
TORQUE, FT-LB	191.0	191.0	2.4	2.4	-14.4	-14.6
POWER, BHP*	147.6	147.6	.4	.4	2.7	2.7
FUEL RATE, LB/HR	78.4	78.5	3.7	3.7	3.9	3.9
IGNITION TIMING, DEG BTDC	28.0	28.0	24.0	24.0	26.0	26.0
MANIFOLD VACUUM, IN HG	2.0	2.0	19.3	19.3	21.1	21.1
THROTTLE ANGLE, DEG	71.0	71.0	.0	.0	.0	.0
INTAKE MAN. TEMP., F	93	93	136	136	121	121
CONCENTRATIONS, DRY BASIS						
CO, %	4.4700	4.4700	.4655	.0010	.4046	.0010
CO2, %	12.01	12.13	10.50	12.62	8.23	12.50
O2, %	.05	.03	6.00	3.28	8.50	3.50
HC, PPMC	1193	656	19429	226	21733	226
NOX, PPM	1100	538	33	74	11	48
AIR/FUEL RATIO	12.90	12.93	16.91	17.33	19.30	17.53
EMISSION RATES, G/HR						
CO	18581.6	18638.6	122.3	.3	130.5	.3
HC	249.0	137.4	256.3	3.0	352.0	3.2
NOX+	673.3	330.0	1.2	2.8	.5	1.9
OIL TEMPERATURE, F	265	265	180	180	187	187
OIL PRESSURE, PSI	35	35	26	26	30	30
COOLANT TEMPERATURE, F	193	193	180	180	178	178
EXHAUST PRESSURE, IN. H2O	160.0	149.0	1.0	.0	2.0	1.0
EXHAUST TEMPERATURE, F	1474	1410	578	777	474	883

* CORRECTED SAE J816B
+ CORRECTED FOR HUMIDITY

ENGINE CODE CHE305

TEST NUMBER	130.1	130.2	131.1	131.2	141.1	141.2
TEST DATE	3/31/77	3/31/77	3/31/77	3/31/77	4/18/77	4/18/77
FUEL CODE	7619	7619	7619	7619	7619	7619
BAROMETER, MMHG	748.1	748.1	748.1	748.1	739.4	739.4
HUMIDITY, GRAINS/LB	44	44	44	44	68	68
TEMPERATURE, F	79	79	79	79	97	97
ENGINE SPEED, RPM	1500	1500	2000	2000	3500	3500
TORQUE, FT-LB	-33.6	-33.6	-46.4	-46.4	216.0	216.0
POWER, BHP*	9.5	9.5	17.5	17.5	147.3	147.3
FUEL RATE, LB/HR	3.7	3.8	4.0	4.1	75.6	75.5
IGNITION TIMING, DEG BTDC	33.0	33.0	1.0	1.0	28.0	28.0
MANIFOLD VACUUM, IN HG	23.4	23.4	24.3	24.4	1.8	1.8
THROTTLE ANGLE, DEG	.0	.0	.0	.0	70.0	70.0
INTAKE MAN. TEMP., F	124	124	140	140	97	97
CONCENTRATIONS, DRY BASIS						
CO, %	.3753	.0010	.4180	.0010	5.2040	5.2400
CO2, %	7.41	12.50	6.08	12.26	11.22	11.33
O2, %	10.50	3.50	12.38	3.80	.01	.01
HC, PPMC	21562	282	21296	450	1517	1003
NOX, PPM	12	32	14	22	625	350
AIR/FUEL RATIO	21.71	17.52	24.91	17.79	12.50	12.53
EMISSION RATES, G/HR						
CO	128.6	.3	180.4	.3	20344.2	20484.9
HC	371.1	3.8	461.5	6.8	297.9	196.9
NOX+	.6	1.2	.9	.9	389.4	218.0
OIL TEMPERATURE, F	192	192	198	198	263	263
OIL PRESSURE, PSI	33	33	35	35	33	33
COOLANT TEMPERATURE, F	179	179	180	180	193	193
EXHAUST PRESSURE, IN. H2O	2.0	.0	3.0	.0	212.0	.0
EXHAUST TEMPERATURE, F	431	0	400	0	1441	0

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